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CONTENTS.

SECTIONS.

PAGES

Amoebiasis and Dysentery 43–69, 243–75
Beriberi and Polyneuritis Avium 174–81
Blackwater Fever 40–2
Books Reviewed 70–2, 158–9, 240–2, 312–16, 470–1
Cholera 113–22
Dysentery, Bacillary, Ciliate, Flagellate, Mixed or Unclassed 55–61, 255–75
Enteric Fevers in the Tropics 432–58
Fevers in the Tropics, and Dengue 182–5
Heat Stroke 169–73
Helminthiasis 73–112
Japanese River Fever 194
Kala Azar 143–57
Leprosy 401–10
Malaria 1–39, 280–311
Miscellaneous 210–39
Plague 459–69
Protozoology 417–31
Rat-Bite Fever 189–93
Relapsing Fever 195–209
Rocky Mountain Spotted Fever 186–8
Sleeping Sickness 161–8
Sprue 276–9
Tropical Diseases of the Skin 387–400
Tuberculosis in Native Races 411–16
Typhus 123–42

Index to Applied Hygiene in the Tropics . . . 521
Index of Authors 473
Index of Subjects 481

Lists of References to Literature .. .. i–lxxix

CHARTS.

PAGES.

Agglutination Curves in Typhus Fever 133

Agglutinograms in Cases of Enteric Fever 447, 448

Curves of Growth of *V. cholerae* in Selective Media .. 117

Enteric Cases in the Eastern Army of France before and after Inoculation 454

Showing Atropine Tests in Typhoid.. .. .. *facing* 134

Showing Preservation of Enterica Bacilli in Stools Emulsified with Glycerine 445

Weight Charts of Experiments Showing the Anti-Scorbutic Value of Orange Juice and Fresh Cabbage Leaves *facing* 176

DIAGRAM.

Possible Affinities of the Genera of Tetramitidae.. .. 419

ERRATUM.

Page 282, last line of FIORITO summary, for "*superpictus*" read "*pseudopictus*."

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

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MALARIA.

THOMSON (John D.). **Notes on Malaria.**—*Jl. Roy. Army Med. Corps.* 1917. Oct. Vol. 29. No. 4. pp. 379–411. With 1 plate & 8 text-figs.

For searching observation and clear thinking this paper touches high-water mark. It is full of facts—many of them novel—which are shown in all their bearings and synthesized with fastidious judgment; the conclusions comprehend the facts and do not go beyond them; and speculation is apposite and restrained. These features are particularly apparent in the second and most original part of the paper dealing with some interesting contingencies and episodes in the life-history of the malaria-parasites.

Part I contains a critical account of the author's observations in the treatment of the active stages of the disease by intravenous injections of quinine. MACGILCHRIST's opinions on quinine by injection are weighed, and are answered, so far as intravenous injection is concerned, by a technique that ensures the high dilution of the drug postulated by MACGILCHRIST. The author's principle is to get the necessary dilution accomplished by the circulation of the blood itself, and this is effected by extremely slow injection through a needle of very fine bore. The injection always used was a 20 per cent. solution of the bihydrochloride in saline, scrupulously prepared and sterilized. In making an injection 15 to 20 seconds are occupied in injecting each cc., and a pause of some seconds is made between each cc. injected. The exact technique is fully described.

In 18 consecutive cases of malignant tertian in the active stage a single intravenous injection of 5 cc. of the standard 20 per cent. solution (i.e. 15 grains of quinine), given as soon as the nature of the fever was determined, broke the attack in every case, so that subsequently the temperature could be kept down by mouth-doses of quinine which before the injection were impotent. Ring-forms disappeared quickly from the peripheral circulation, but not crescents.

In 32 cases of benign tertian a single intravenous injection of 4 cc. of the standard 20 per cent. solution (i.e. 12 grains of quinine), given during a paroxysm, broke the attack, so that the paroxysm next in expectation did not occur. All forms of the circulating parasite were affected, but not equally, the gametocytes disappearing last of all.

Two interesting incidents of the author's experience, relating respectively to galyl and tartar emetic, are recorded.

An active case of malignant tertian had been treated by one of the physicians at the King George Hospital (where all the work under reference was done) with a full intravenous dose of galyl. The author examined the case daily for the next three days, but neither ring-forms nor the patient's temperature seemed to be influenced in the slightest degree.

In a case where the only forms of circulating parasites that could be detected were crescents 6 centigrammes of tartar emetic were given by intravenous injection: instead of killing the crescents, it either produced or hastened conditions favourable to the onset of a relapse of benign tertian, the coexistence of which in a latent form had not been suspected. A second dose of 8 centigrammes of tartar emetic was given 9 days after the first: no effect was manifest upon the crescents and the development of the relapse of the coexistent benign tertian was not arrested. The author criticises ROGERS' suggestion as to the conditional use of tartar emetic very fairly, as well as his loose and arbitrary terminology.

Part II, which deals *inter alia* with SCHAUDINN'S "parthenogenetic" theory of malaria-relapses, is a contribution to natural knowledge of the highest importance. It is a discerning presentation of a cautious piece of work, and the text must be read in company with the plate—which, most unfortunately, has not been reproduced in colour owing to the difficulties of the time.

The author begins with a criticism of SCHAUDINN'S use of the term parthenogenesis. Parthenogenesis, as a well understood biological term, implies that an unfertilized ovum, or virgin female gamete, under certain conditions reaches exactly the same range of development as a zygote, or ovum conjunct with a male gamete. Now, in the normal course of development a zygote of *P. falciparum* terminates in a progeny of sporozoites, and if parthenogenesis in this species were indeed a fact, the unfertilized female gamete should likewise develop into a progeny of sporozoites.

This is not a mere dialectic point. It goes to the root of things, and not only lays bare a misconception of terms and a confusion of thought, but shows that in postulating the reversion of a gamete into a schizont —the gamete always being a peculiarly-determined and highly differentiated cell—SCHAUDINN invoked a phenomenon which, so far as is known, is unparalleled in biology. Nature, indeed, hath framed strange ova in her time: some, for instance, that become the pabulum of a single one among them that develops into an embryo: but a gamete that reverts to the status of an ordinary non-sexual cell is a phenomenon that demands very ample confirmation.

The author next criticises SCHAUDINN'S venue. The preparations in which that author observed his questionable macrogametosporonts were made within the 48 hours antecedent to the actual paroxysm of a relapse at 3½ months; but, as the author points out, to expect to find at that moment forms that *initiate* the series of schizogonies implied in a relapse, is as unreasonable as to expect to find, on the twelfth day of incubation of a normal primary infection, the initial sporozoites of that infection.

So far from confirming SCHAUDINN's observations, the author in a series of descriptions and extremely accurate drawings (as those can testify who have seen his beautiful slides), demonstrates, from films of peripheral blood taken both during and after paroxysms of relapsing cases of malignant tertian, various combinations of ordinary gametocytes with ordinary schizonts that closely resemble the figures interpreted and published by SCHAUDINN as schizogony of macrogametes. Several types of combination are represented, some of which (e g. two sporonts in one cell, and two gametocytes in one cell) are familiar, while all the others have possibly been seen—but have never been recognized—by other observers: just as generations of demonstrators demonstrated the gills of the common lobster to generations of students, without observing, though they might have seen, a small pair on the seventh appendages, until at last the pair was recognised by an unusually observant student.

It is highly probable, therefore, that the author's observations, and his interpretation of SCHAUDINN's so-called parthenogenesis as a fortuitous combination of a gametocyte and a sporont will soon be amply confirmed: the only condition necessary, as the author states, is that there shall be mature gametocytes present in the blood when the films are made.

The probable explanation of the persistence of gametocytes in long chronic cases is discussed, as well as the theory of relapses in general; but these are conjectural matters which, though ably handled, are here precluded by limitations of space.

The author concludes with an account of some final phases in the development of crescents, which have not hitherto been described. His observations were made on a film of blood known to contain many crescents. The film, after moist incubation at 30° C. for a short time, was fixed with osmic acid vapour for 15 seconds and then with methyl alcohol, and stained with Giemsa. A series of crescents of both sexes were observed, and some are figured. The maturation, by extrusion of polar bodies, is equally exhibited in both sexes. In both sexes there is a limiting membrane: in the male it is thinner and gives way diffusely to allow the escape of the gametocyte: in the female it is thicker and usually gives way in a definite region near the middle of the concavity of the curve, and the gamete is gradually extruded, leaving an empty shell behind, though sometimes the polar bodies adhere to the shell. As the author says, conclusive proof that these phenomena are normal can only be furnished by a series of examinations of Anopheles after they have fed on blood containing crescents.

A. Alcock.

THOMSON (David). **The Diagnosis and Treatment of Malarial Fever.**—*Jl. Roy. Army Med. Corps.* 1917. June, July. Vols. 28, 29. Nos. 6, 1. pp. 658–685; 1–37. With 18 charts.

An able dissertation, in which the subject is critically analysed in the contributory light of 200 cases—representing all phases of the disease from many parts of the world—studied at Liverpool under conditions approximating to the strictness of experimental methods. Modern methods of diagnosis are lucidly described, all classical systems of treatment are reviewed with judicious care, and particular attention is given to numerous subsidiary points—e.g., the course of the disease without quinine treatment or with insufficient quinine treatment, the relative values of different quinine salts, the physiological effects of large doses of quinine, the causes of relapses and of pernicious symptoms—which correct the view or influence rational treatment.

The importance of early and thorough quinine treatment is duly emphasized, 30 grains daily given in solution by the mouth for a term of three weeks, or perhaps even longer, being a curative minimum confirmed by the author's blood-examinations; but the necessity of continuing treatment to the complete disinfection stage, by destroying all the gametes, is insisted on. Quinine resistance is duly considered, though in the author's 200 cases only one such occurred—a very heavy mixed infection of benign and malignant tertian. With reference to cinchonism the author states that few or no complaints were heard in his series of cases, and that one patient voluntarily took 100 grains of quinine in one day without hurt. The author is very sensible on the subject of quinine prophylaxis, understanding its uses, as well as its limitations and abuses; he considers 15 to 20 gr. daily a reasonable dose, to be taken at bed-time when mosquitoes are getting to work and also the prospective sleeper may hope to be unconscious of its physiological effects—an argument that assumes immediate absorption of the quinine.

In discussing the cause of relapses the author thinks it unnecessary to do more than assume that owing to insufficiency of quinine treatment all the non-sexual stages of the parasites have not been destroyed. Cases occurred in the author's series, of a sudden rise of temperature accompanied perhaps by slight shiverings, where, however, the most prolonged and repeated scrutiny failed to detect parasites. Such cases he terms pseudo-relapses, since he found on investigating the hospital records and charts of 100 cases of various non-malarial diseases that similar more or less inexplicable isolated rises of temperature occurred in 17 per cent. of them.

With regard to the "pernicious" symptoms so frequently supervening in malignant tertian, the author attributes them to embolism caused by clumping of the red-blood-cells in the vessels of the internal organs where chiefly the parasites of this kind sporulate.

A. A.

Abrami (P.) & Sénevet (G.). **Recherches sur la pathogénie du paludisme à *Plasmodium falciparum*. Rôle de l'immunité. La réaction schizontolytique. Mécanisme des rechutes.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Mar. 22. 3 Ser. Vol. 33. No. 9–10. pp. 519–534.

The proposition formulated by the authors is that in malignant tertian the two phases of the malaria parasite, schizont and crescent, are conditioned by chemico-physiological changes in the blood: that as a result of the ordinary vegetative multiplication of the parasite antibodies (lysins) appear temporarily in the blood, which the parasite parries by encystment—the crescent being a true defensive cyst: that so long as the antibodies are sufficiently concentrated the cysts (crescents) remain quiescent and the host enjoys a state of precarious immunity—manifested by freedom from febrile attacks: and, finally, that as this temporary immunity gradually wears out, or when as a result of enervating accidents of divers kinds it suddenly breaks down, the cysts (crescents) are free to germinate and a relapse follows upon their germination. According to this theory malignant tertian malaria is to be regarded as a species of relapsing fever, comparable clinically to a spirillosis, and both clinically and biologically to amoebic dysentery.

Theories like, or something like, this and based on similar assumptions, are not exactly new, so that it is hardly necessary to recapitulate the authors' evidence as to the active existence of antibodies, or to follow their argument—which is considerably of an *ex hypothesi* complexion—that crescents are cysts. It is sufficient here to examine the evidence offered on the two crucial points (a) that the activity of the "antibodies" (or whatever it is that constitutes the temporary toleration of the parasite in the intervals between relapses) puts an end to all forms of the parasite except crescents, and (b) that the crescents proliferate in the patient.

On the first point (a) all that the authors have to say, apart from inferences from general principles, is that examination of the blood during the intervals between relapses "only reveals crescents"—which, like "what the soldier said," is not evidence positive.

On the second point (b) they state that a relapse is always preceded by a decrease in the number of crescents and by the appearance of young Plasmodia—that everything happens *as if* the latter were formed from the former in the organic depths. But, beyond this, they state that they have actually observed, in no less than 20 subjects, certain stages in the "parthenogenetic" transformation of crescents into a progeny of merozoites. This transformation, which was observed only in macrogametes, resulted in the segmentation of the nucleus into 7 chromatin masses grouped as a rosette. Particular stress is laid upon the constancy and significance of the number 7, as being exactly half the normal standard of the schizogony of this species among the issue of the ordinary sexual process. They state that this "parthenogenetic" schizogony can be observed most easily in patients whose blood contains a large number of crescents.

A. A.

GILL (Clifford A.). **The Prevention of Malaria in War, with Special Reference to the Indian Army.**—*Jl. Roy. Army Med. Corps.* 1917. Oct. Vol. 29. No. 4. pp. 439–456.

The writer gives it as his impression—an impression justified by his personal experience, if not supported by statistics—that the greater part of the sickness that occurs in the native Indian army is attributable either directly or indirectly to malaria. As regards the Punjab, at any rate, which is one great recruiting ground of the Indian army, the recruits come from a population which is widely infected every year, and in some years grossly infected. In the ranks of the army, as well as among recruits, there is a large proportion of men who seem healthy enough, yet are found, when attention is directed to the point, to have their spleen enlarged. Such cases may never come to hospital, or may come for some complaint which, though really contingent upon chronic malaria, is not definitely attributed to malaria in hospital returns.

Arguing from these premises, which surely are not greatly questionable, the writer insists that the problem of prevention of malaria in war largely resolves itself into the prevention of malaria, in cantonments at the very least, in time of peace; so that the army may confidently take the field, especially if the conditions of the field be favourable to malaria, quite free of autogenous infection.

In addition to advocating general measures of sanitation and special measures for the prevention and discomfiture of mosquitoes, the writer particularly identifies himself with a precise method of quinine prophylaxis which he followed with much success in Muscat [see this *Bulletin*, Vol. 9, p. 67]. Every recruit and every man attending hospital should at least have his spleen examined (if examination of blood be not feasible), and the examination should not be perfunctory. The results should be entered in a Malaria Register, and the name of every man showing any indications of infection should be entered in a Quinine Register, the man himself being supplied with a corresponding card; and on this methodical plan a sustained effort should be made to eliminate individual infection by regular and inexorable administration of quinine.

As regards prevention of malaria on active service, the author considers that although in camps on lines of communication, etc., anti-mosquito measures of appropriate kinds may be hopefully applied, yet in the front line the obstructions are so manifold that the only practicable method of preventing malaria is by the regular administration of adequate doses of quinine. Since the drug is eliminated within 48 hours it must be given at intervals of not less than that. In highly endemic tracts the dose should be not less than 10 grains daily. The drug must be given in solution and under satisfactory supervision.

This is a bare summary of a thoughtful paper well worthy of perusal in its entirety.

A. A.

TRINIDAD. **Malaria Report, including Reports on: (1) Spleen Census, 1914. (2) Anopheles Survey, 1914–1915. (3) Trinidad Mosquitoes, 1915.**—C. F. LASSALLE and Assistant Sanitary Inspectors. 126 pp. **1916.** Trinidad: Printed at the Government Printing Office, Port-of-Spain.

This report, which is a record of well-planned and well-administered work, includes the systematised results of a spleen-census and of an Anopheles survey—the latter comprising nearly three-quarters of its volume—and also contains a classified list of Trinidad mosquitoes.

The spleen-census was carried out, by medical districts and sub-districts, in the month September–October: the total number of children examined for all districts collectively was 25,927, and the percentage of enlarged spleens was 14·1.

The Anopheles survey was conducted, also by district organisation, according to detailed instructions from headquarters upon the following specific points: breeding-places to be determined by systematic inspection of all waters, including water retained in holes of trees and leaves of plants; larvae to be collected and bred for specific identification; actual breeding-places to be generally surveyed and their physical features as well as their relations to villages, etc., roads, and lines of drainage to be recorded; the same with low-lying land obviously liable to flooding; habits of adult insects and predilection for houses to be observed; possibilities of preventive measures to be estimated on the spot.

Generally speaking the breeding-places were of the usual kind—slow-running streams and rivers, pools in ravines, grassy land broken by depressions and crab-holes on the borders of mangrove swamps, rice-fields, ponds, shallow wells, borrow-pits of roads and railways, excavations for building material, blocked and ill-graded road and street drains.

A. A.

Leger (Marcel). **Le Paludisme à la Guyane Française: Index endémique des diverses localités.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 749–756.

The author reviews the impressions and opinions recorded by earlier medical writers unfavourable to French Guiana. In his own tours of inspection he has examined the spleen and the blood of children—520 in all—in 15 communes. The spleen-index ranged from 3·6 in St. Laurent to 43 in Monsinery, and the mean of all districts was 17. The commonest infection observed was benign tertian, 68 per cent., the rarest was quartan, 3 per cent., leaving 28 per cent. of malignant tertian. On the whole the author considers that the deplorable reputation of the colony is undeserved.

A. A.

Kelly (F. L.) & Geiger (J. C.). **Endemic Index of Malaria in the Northern Sacramento Valley, California.**—*Jl. Amer. Med. Assoc.* 1917. May 5. Vol. 68. No. 18. pp. 1319–1320.

The endemic index was determined, from examination of 808 school-children and by thin blood-smears only, to be 4·7 per cent., which is said to be low in comparison with von Ezdorf's determinations in some of the southern States. The proportion of subtertian infections was high (22 per cent.). Only 1 quartan infection was discovered. The percentage of carriers was found to be highest between the ages of 11 and 15—double that below 11 and above 15.

A. A.

Delanoë (P.). **Contribution à l'Étude du Paludisme au Maroc Occidental. I. L'Épidémie palustre des Oulad Hassoun.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 586–611. With 1 map & 1 fig.

An account in considerable detail of epidemic malaria chiefly in the hilly tracts of Western Morocco. The only *Anopheles* encountered was *maculipennis*. With the exception of a few cases (0·6%) of quartan, all the cases were benign tertian, or malignant tertian, or mixed infections of both. A remarkable feature of the epidemic was the "precocious gametogony" observed in the blood of the fresh cases of infection.

A. A.

SERGENT (Edmond) & SERGENT (Étienne). **Études épidémiologiques et prophylactiques du paludisme. Treizième et quatorzième campagnes en Algérie en 1914 et 1915.**—*Ann. Inst. Pasteur.* 1917. June. Vol. 31. No. 6. pp. 253–268. With 6 figs.

In 1914 there was a remarkable recrudescence of malarial fevers in many parts of Algeria, and in 1915 a general epidemic, recalling in violence that of the year 1904. The phenomenon is explained partly by the fact that both in 1914 and 1915 the spring and summer were wet, the spring particularly so; and partly by the interruptions of the antimalarial service consequent upon the exigencies of the War. The paper contains an interesting account of the antimalarial measures practised.

A. A.

SERGENT (Étienne). **Les enseignements d'une année d'épidémie foudroyante de paludisme dans la Mitidja (Algérie).**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 548–550. With 8 figs.

The author states, from 10 years' experience of a particular area, that quininisation of native human carriers of malaria, under European supervision, is efficacious; in ordinary seasons quininisation every second day, or even every four days, has good effects, but in times of epidemic it must be carried out daily.

A. A.

RAVAUT (Paul), RENIAC, DE KERDREL & KROLUNITSKY. **Le paludisme d'Orient vu à Marseille.**—*Presse Med.* 1917. Aug. 16. Vol. 25. No. 46. pp. 473–476.

In a large experience of malaria patients returned from Macedonia the authors were struck by the irregularity and disguise of the symptoms—notwithstanding that the examination of the blood revealed parasites of the recognized species—and above all by the persistence of the disease in spite of the enormous doses of quinine prescribed on their clinical charts. As regards these phenomena, particularly the last, the authors satisfied themselves by proper examination of many cases that the patients had not been taking the quinine prescribed, and then demonstrated by strict surveillance that these patients really were not resistant to quinine.

In the treatment of malaria—after trying intravenous injections of novarsenobenzol and quinine with good but not permanent results, and subcutaneous injections of atoxyl and quinine, with only moderately good results, and autohaemotherapy, which they were not entirely satisfied with—the authors decided that quinine and arsenic combined was the simplest and best method. They prefer to give the quinine by the mouth, at least 2 grams a day, with the principal meals, perhaps in wine; the arsenical preparation they finally recommend is arrhenal, a subcutaneous injection of 20 to 30 centigrams daily. They do not give both drugs every day, but two days quinine, then two days arsenic, and so on for a month to 45 days. If the patient is not "sterilised" by this course of treatment, a second shorter course must be taken. In asthenic cases adrenalin may be added.

In conclusion the authors express the opinion that the treatment of malaria in the army is as much a matter of military discipline as of medical knowledge.

A. A.

CASTELLANI (Aldo). **Notes on Tropical Diseases met with in the Balcanic and Adriatic Zones.**—*Jl. Trop. Med. & Hyg.* 1917. July 16. Vol. 20. No. 14. pp. 157–164. With 1 plate & 4 charts.

These "Notes," so far as this first instalment goes, are less notes than a methodised epitome of the Protean disguises assumed by malaria in the Balkan territories—disguises which the author's experience of tropical countries has enabled him to penetrate. The object of their publication is to impress upon such medical officers as may join the Balkan forces without similar experience, the necessity of careful examination of the spleen and repeated investigation of the blood, and the expediency of testing the effect of quinine, whatever be the type of fever and the trend of symptoms that he may be called upon to treat. Though the author appositely supplements his "Notes" from his experience in Ceylon and other tropical latitudes, his survey is designed to include just the cases that have particularly attracted his attention during the last two years while working in the Balkan area. It will be seen from the ensuing abstract that in the Balkans malaria puts on almost every puzzling mask that has ever been described, and, by comparison with text-book standards, is like Fluellen's description of Fortune, "turning, and inconstant, and mutability, and variation." The following is the list of malarial disguises and complications that have actually come under the author's notice, a wonderful record :—

(1) *Haemorrhagic malaria.*—In one instance of a severe scorbutic type suggesting an outbreak of scurvy.

(2) *Pernicious-anaemia-like malaria.*—One of these cases was treated for months as pernicious anaemia, until at length an access of high fever, and the appearance of subtertian rings (of which at first there had been no evidence) pointed to quinine and to recovery.

(3) Profound anaemia and other symptoms suggesting *cancer*; one case in an old man; crescents were found at last, and quinine proved efficacious.

(4) *Polyneuritis* sometimes simulating wet beriberi; a number of cases were observed.

(5) *Malarial syndromes of the central nervous system*; the comatose type was quite common; the delirious type, occasionally confused with alcoholic D. T., several cases; one case closely simulated cerebrospinal meningitis; cases of a purely cerebral type, suggestive of hemiplegia, monoplegia, or cerebral tumour; one case of clinically typical transverse myelitis, and one case closely resembling disseminated sclerosis, both due to malaria; two cases of apparent mania and one of apparent melancholia, all cured by quinine.

(6) *Malaria counterfeiting infectious specific diseases.*—Typhoid-like malaria was common, so much so that once at Gevgheli an epidemic of typhoid was reported; but the bacterial examinations were negative and the malarial positive. One case suggestive of Malta fever did not respond to quinine by the mouth, but yielded to intramuscular injections. In one fatal case the symptoms resembled yellow fever;

in another, haemorrhagic jaundice. A typically tetanus-like case was found to be malarial. (In Ceylon the author was called in consultation to a case of supposed hydrophobia with a history of dog-bite, which proved to be a heavy malarial infection; and in a tropical country where sleeping sickness is unknown, he followed a case of the sleeping sickness type, the blood being negative for all kinds of parasites, until at the end of six months a few malarial parasites were found, and recovery followed with quinine.)*

(7) *Malaria simulating diseases of the digestive system.*—Malarial pseudodysentery, sometimes with typical dysentery stools, sometimes merely with blood in the stools; several such cases were seen, and the author alludes to a case in Ceylon which had been treated for dysentery until an examination of the spleen indicated the true nature of the disease and instigated successful treatment. Malarial pseudocholera was once seen in the Balkans, but not such a typically and severely choleraic case as once occurred in Colombo, during a cholera epidemic, when the author as consultant was able to demonstrate rings and to effect a cure with quinine. Of a cholocystitis syndrome three cases were observed. Cirrhosis of liver, with ascites and dropsy of feet; one case occurred where malarial parasites were at length found and quinine treatment slowly brought about a cure. Acute haemorrhagic pancreatis; one case diagnosed as such by the physician in attendance and proposed for operation was found to be malarial and was soon cured with quinine. Pseudoappendicitis; several cases came to the author's notice, one of them had actually been operated upon by a surgeon before the malarial parasites were detected. Pseudoperitonitis; one case reported as peritonitis was found by the author to be malarial, and was cured in a few days by quinine. (The author also notes a case that came before him in consultation, in Ceylon, where a supposed hepatic abscess was found to be subtertian malaria; but he warns the inexperienced practitioner that the converse error of mistaking hepatic abscess for malaria is more frequent.)

(8) Malarial complications of the *respiratory system.*—Dry bronchitis and dry pleurisy of malarial origin have been observed in the Balkans.

(9) *Cardiac and vascular complications.*—The author has observed cases of angina pectoris syndrome, peripheral arteritis and gangrene, intermittent claudication, erythromelalgia, and acroparesthesia, as well as palpitation, tachycardia, arrhythmia, and heart-block, all due to malaria.

(10) *Reproductive system.*—A case of orchitis and a case of priapism have been observed, both due to malarial parasites and cured by quinine.

(11) *Skin diseases.*—In the author's experience of malaria herpes, urticaria, erythema of various kinds including scarlatina-like erythema followed by desquamation in large flakes, oedema suggesting Calabar swellings, and even a shotty papular eruption that had been suspected to be small-pox are all mentioned.

The principles of the therapeutic and preventive treatment of malaria are broadly considered.

A. A.

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*For a similar case consult *Sleeping Sickness Bulletin,* Vol. 1, p. 429 [Ed.]

ARMAND-DELILLE (P.). **Remarques sur les aspects parasitologiques du Paludisme contracté en Macedoine.**—*C. R. Acad. Sci.* 1917. July 30. Vol. 165. No. 5. pp. 202–203.

The author is impressed by the facts that among the French troops in Macedonia the predominant malarial infection between the beginning of July and the end of March following was *P. falciparum*, and the predominant infection from April onwards to July was *P. vivax*. In October 95 per cent. of all cases of malaria were *P. falciparum*: after April 115 out of 116 blood examinations showed only *P. vivax*. Again, at the hospital for malaria patients at Vichy, at the end of June and beginning of July he could find only *P. vivax*. Further: Dr. WURTZ, in charge of a hospital for returned army malaria patients in Paris, found that after the month of December *P. vivax* was completely "substituted" for *P. falciparum*; even in patients who had had pernicious malaria he could then find only parasites of benign tertian.

How is it, the author asks, that the parasite usually so resistant to quinine disappears in the spring, giving place then to the parasite usually so sensitive to quinine? Is there a transformation of *P. falciparum* into *P. vivax*? Is *P. falciparum* merely the form that persists in the internal organs? Is LAVERAN's theory of the unity of malaria parasites correct?

A. A.

LAMOUREUX (A.). **Le paludisme autochtone de la région du Lac Presba (Albanie du sud).**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 707–710.

A brief account of an uncompleted malaria-survey of nine villages near the south-western shores of L. Presba in Albania. The survey was started on the 10th April and came to a premature end on the 2nd August. In addition to spleen-examinations made on the spot, examinations of blood were made in the laboratory at Salonica. The endemic index was low. Anopheles were found in all the villages, even in a village 3,000 metres distant from any breeding-place, but were not numerous. Larvae of Anopheles appeared in April in the village ponds; in June and July they were very abundant in the pools and lagoons of the shores of the lake, but they were never found in the lake itself. The only malaria parasite discovered was that of benign tertian.

A. A.

WERNER (H.). **Die Malaria im Osten und ihre Beeinflussung durch die Besonderheiten des Krieges nebst Bemerkungen über Anophelenbiologie und Malariatherapie.** [Malaria on the Eastern Front as influenced by the Special Conditions of the War, with Remarks on Anopheles and on Treatment.]—*Münch. Med. Woch.* 1917. Oct. 15. Vol. 64. No. 42. pp. 1375–1377. With 3 charts.

The "text" of this paper is a chart of the incidence of malaria in a corps on the Eastern front [locality not given] in the summer of 1916. It shows that malaria was present at the beginning of March, mained at the same, low, level till the middle of April, then increased till the end of the first week of June, and diminished till the first week in July, when the curve rose abruptly to 2½ times its former height in the first week of August, dropping six weeks later and reaching its original level the last week in September. There was thus a small wave followed by a large wave. The peculiarity of the situation lay in the facts that the civil population had been all removed and that the soldiers introduced were originally free, or practically free, from malaria. The first wave is attributed by the author to infected Anopheles that had survived the winter. The curve of occurrence of Anopheles—they were first seen at the end of April and became numerous at the beginning of July—was found to correspond approximately to the second wave, but some three weeks removed, Whence did the new mosquitoes derive their infection? He discusses as possible sources the civil population, infected soldiers of the first wave, soldiers with an infection acquired elsewhere, captured Russians and deserters and the opposed Russian front, and rejects them all for reasons given. The survival of the hibernated mosquitoes is considered, but in that case one would expect a uniform curve gradually dying away. The only possibility left, apart from prolonged incubation in the troops, is inheritance of the malarial infection in the mosquito. The analogies for such an inheritance in an insect are mentioned. It is admitted that morphological proofs are wanting, but the author thinks that his observation favours this hypothesis.

The observations on the bionomics of Anopheles were that they have a special predilection for latrines [see this *Bulletin*, Vol. 9, p. 367] and that they can withstand a great degree of cold. Anopheles which had suffered for a week a temperature of 10° to 25° C. revived a few hours after being brought into room temperature and flew about. The author suggests that these are the mosquitoes which survive the winter, and those that take refuge in living-rooms succumb.

As to treatment, some 15 per cent. of the cases (tertian) relapsed, which the author attributes to quinine fastness, described by him in 1910.

A. G. B.

KIRSCHBAUM. **Zur Epidemiologie der Malaria.**—*Münch. Med. Woch.* 1917. Oct. 23. Vol. 64. No. 43 pp. 1407–1408. With 5 charts.

Relates to an epidemic of benign tertian among German troops "in the ice and snow of north-western Russia," in 1916. Beginning with a few cases in February and March, it rose rapidly in April, culminated in May, and sank less rapidly through June, July and August. But the expected revival in August-September did not occur, a deviation from normal experience that may possibly, the author concludes, be attributed to the inclement weather being unfavourable to the development of malaria parasites in the local mosquitoes and possibly adverse to the insects themselves: since the temperature-curve from March to October remained above 15° C. only in July. From the distribution in the regiments and from the apparent infrequency of malaria among the local peasantry the author considers that the cases were relapses from (? delayed manifestations of) infections of the previous summer, and were not immediate infections from wintering mosquitoes. He has therefore to assume that the disease remained latent for 6 to 11 months though the troops were doing hard work under exposure, and he suggests that the extreme cold of the winter retarded the activity of the parasites.

A. G. B.

APPEL (Leo). **Ueber die Ursachen der Malariarückfälle.** [The Causes of Relapses in Malaria.]—*Wien. Klin. Woch.* 1917. July 19. Vol. 30. No. 29. pp. 910–912. With 2 charts.

The author writing from a "malaria laboratory" at Sarajevo has noticed that in chronic malaria relapses occur on particular days which have no relation to the developmental cycle of the parasites. On certain days, and often at the same hour, a whole concourse of relapses occur, and then for some days among hundreds of patients only two or three have fever; and the examination of the blood corresponds. It is as if the parasites of all the patients were connected by an invisible tie, so that at some definite impulse all the dormant "gametocytes" were incited to proliferate. The phenomenon is not to be explained by the "natural selection theory" that relapses naturally occur at the season when Anopheles swarm, nor by the theory of the general quickening of all life in spring, nor by the influence of mean temperature and duration of sunshine. The true (*zwar*) explanation is the influence of a disturbed barometer—the greater the disturbance of the atmospheric pressure the more frequent are the relapses. In support of the theory the barometer-curve and the curve of malaria relapses at Sarajevo for a definite term (20th Dec. 1916 to 31st Jan. 1917) are compared—sudden falls of the barometer and records of relapses generally synchronize. Other miscellaneous observations are brought into line with this theory, among them the subsidence of malaria at high elevations, where fluctuations of the barometer are diminished. This theory of scientific causation would hardly satisfy a logician; fluctuation of atmospheric pressure covers a plurality of causes; the fact that the world is a habitable world and not a howling wilderness may be said to be due to fluctuations of atmospheric pressure.

A. A.

BISWAS (S. C.). **A Case of Malaria acquired in England.**—*Lancet.* 1917. Sept. 8. p. 388. With 1 chart.

A concise account of a typical case of benign tertian acquired in the Isle of Sheppey, in which the evidence quite fairly justifies the conclusion that the infection was imparted by the local Anopheles, which in turn were infected from a case, or cases, of malaria imported from abroad.

The obvious moral is that returned malaria convalescents from the Expeditionary Forces should be excluded very carefully from the Isle of Sheppey and other places where *Anopheles maculipennis* is plentiful and is known to frequent houses.

A. A.

FIRTH (A. C. D.). **Malaria acquired in England.**—*Lancet.* 1917. Aug. 4. p. 162. With 1 chart.

A case of benign tertian. The patient, age 20, had never been out of England, and was in good health until, after joining the army, he reached a depot where men returned from Salonika are drafted; among these returned men cases of malaria often occur.

A. A.

i. WILCOX (R. Loy). **Another Case of Malaria contracted in England.**—*Lancet.* 1917. Oct. 6. p. 536.
ii. NEWHAM (H. B.). **Malaria contracted in England.** [Correspondence.]—*Ibid.* Oct. 13. p. 581.
iii. OSLER (William). **Home-Bred Malaria.** [Correspondence.]—*Ibid.* Oct. 20. p. 621.
iv. WILCOX (R. Loy). **Another Case of Malaria contracted in England.** [Correspondence.]—*Ibid.* p. 621.

i. The antecedents recorded in this case are that the patient, who had been in England over three months at the moment of the attack, had come from Salonica after being operated upon for a wound there. On this record, and in the absence of any other particulars, it seems unnecessary to assume that the malarial infection was acquired in England.

ii. The writer considers that there is no evidence to justify the opinion that the infection was contracted in England and that a more probable assumption is that it originated in Salonica.

iii. Sir William Osler recommends circumspection in reporting cases of supposed home-bred malaria. and equanimity in dealing with the whole question of imported malaria.

iv. With reference to his previous article the writer states that there was no history of an antecedent attack of malaria and appears to think that settles the case as one of home-bred malaria.

A. A.

ROUBAUD (E.). **Nouveau cas de paludisme contracté sur le front français.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. p. 706.

A trooper hospitalised in Paris for febrile gastritis was found to be carrying a heavy infection (schizonts) of benign tertian. Beyond having been employed in marshy tracts during the year 1915–1916 when he was stationed in the Champagne district, there was no antecedent history of exposure to conditions suggestive of malaria.

A. A.

APICELLA (Gaetano). **Sul problema della malaria nell' Esercito.** [The Problem of Malaria in the Army.]—*Policlinico.* Sez. Prat. 1917. Sept. 30. Vol. 24. No. 40. pp. 1216–1217.

The problem of dealing with soldiers who are the subjects of malaria is a pressing one for the Italian army. The author pleads for the establishment of special labour-corps for work at the higher altitudes on the frontier, composed exclusively of malaria-convalescents, and having a proper equipment of surgeons with hospital accommodation at hand. Furlough is nothing but a waste of time for these men as they go back for the most part to malarious districts.

J. B. Nias

HOFFMAN (Frederick L.). **Malaria as a Factor in Military Efficiency.** —*Southern Med. Jl.* 1917. Aug. Vol. 10. No. 8. pp. 676–678.

The author draws attention not only to the danger of malaria to armies but also to the danger of malaria from armies, and expresses very sound opinions upon the importance of medical entomology, and upon the value of medical entomologists to the Army Medical Service. His opinions on this point cannot be too strongly endorsed or too widely promulgated.

A. A.

MONIER-VINARD & CAILLÉ. **La tension artérielle dans le paludisme fébrile.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Mar. 22. 3 Ser. Vol. 33. No. 9–10. pp. 449–454. With 1 chart.

In all their malarial fever cases (78 in number) the authors have observed a very notable diminution of arterial tension, as determined by PACHON'S apparatus. They have also observed the following variations in arterial tension in the course of the disease :—(a) during the paroxysm, a rise of maximal tension from the shivering stage until the sweating stage, and a lowering of minimal tension throughout; (b) in the intervals of benign tertian, weak maximal tension and a continuation of lowered minimal tension; (c) in the intervals between relapses both maximal and minimal tensions gradually recover, but exhibit variations of a tertian type independent of any rise of temperature.

In the subsequent discussion one of the questions mooted was whether perhaps this diminished arterial tension in army cases of malaria might not be attributable, or partly so, to fatigue and depression.

A. A.

CARNOT (Paul) & BRUYÈRE. **Présentation de cinq cas de mammite paludique.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. June 14. 3 Ser. Vol. 33. No. 19–20. pp. 727–730. With 1 fig.

Five cases of malarial mastitis in men between 25 and 35 years of age, originally infected in Salonica, the mastitis coming on in one case three months, in another case six months, and in two other cases nine months after the first malarial attack. In four cases both mammae were affected, and in three cases colostrum could be expressed from the swollen and tender glands. In every case the inflammatory swelling began at the moment of a paroxysm, increased at each successive relapse, and was long persistent. Independent of the periodic rises of temperature due to malaria there was no general febrile reaction, and the only other notable symptom was swelling and tenderness of the axillary glands.

The diagnosis was confirmed by examination of the blood: in two cases *P. vivax* was found, in the other three cases the exact species is not recorded.

A. A.

Paisseau & Lemaire. **Deux cas de gangrène des membres d'origine palustre.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Feb. 22. 3 Ser. Vol. 33. No. 5–6. pp. 219–235.

An account of two cases of malarial endarteritis affecting not only the smaller visceral vessels where it provoked thrombosis and haemorrhagic infarctation, but also the posterior tibials where it resulted in gangrene of the feet. Both cases were admitted in a very grave condition and showed intense infection with *P. falciparum*: both were young men—30 and 36 years respectively. In one case haemoglobinuria was a complication. The authors give abstracts of both cases and a very full report of the post-mortem examinations.

A. A.

Paisseau (G.) & Lemaire (H.). **L'anémie dans le paludisme primaire.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. June 14. 3 Ser. Vol. 33. No. 19–20. pp. 745–747.

An elaborate terminology of phases of anaemia that occur in recent malarial infections. All, however, according to the author, are essentially amenable to quinine, with adjuvant "haematopoetic medication"; though others may prefer arseno-benzol to quinine.

A. A.

Craig (C. B.). **Disseminated Sclerosis occurring in Chronic Malaria.**—*Jl. Nerv. & Ment. Dis.* 1917. Vol. 45. pp. 350–353.

This case of disseminated sclerosis is attributed to malaria on the evidence of an enlarged spleen, a long antecedent history of malarial attacks recurring every autumn for six years and then ceasing entirely, and present occasional temperature-reaction to quinine: there was no genuine anaemia though the patient's complexion was yellowish, and malaria parasites could not be found in the blood.

In the discussion Dr. W. M. Krauss referred to a case of profound anaemia and emaciation suggestive of carcinoma, in which there was a definite series of symptoms pointing to the central nervous system—double Babinski, increased knee-jerks, ataxic tremor of both arms, absent abdominal reflexes, and nystagmus: the spleen was enlarged and enormous numbers of malaria-parasites were found in the blood: under quinine treatment the parasites and all the neurological symptoms disappeared and the anaemia was very much improved.

A. A.

MAJOLI (Alberto) & PAOLETTI (Fernando). **Sopra un caso di perniciosa malarica a sindrome tetanica.** [A Case of Pernicious Malarial Fever with Tetanic Symptoms.]—*Policlinico.* Sez. Prat. 1917. Oct. 14. Vol 24. No. 42. pp. 1269–1270. With 1 chart.

A soldier under treatment for malarial fever developed trismus and other symptoms of a tetanic nature. The blood contained at the time asexual parasites with a certain number of crescents. No history of an injury or other possibility of infection with tetanus could be obtained. Six cc. of the patient's blood were drawn off and injected in equal proportions into three guinea-pigs, but none of the animals showed signs of tetanus. An endovenous injection of 1½ grammes of quinine was at once given, but the tetanic symptoms persisted and increased, with the result that the patient died in convulsions about 24 hours after their commencement, with a temperature of 41°. In the absence of any history of a possible tetanus infection, the authors ascribe the symptoms to malaria.

J. B. N.

DE BRUN (H.). **L'érythème paludéen.**—*Paris Med.* 1917. Aug. 11. Vol. 7. No. 32. pp. 129–131.

Methodical examination of 160 cases permits the author to affirm that malaria is an exanthema, characterized by an erythema of variable extent and intensity. The rash may appear in any form of the disease light or grave: its nature and variations are described in some detail.

A. A.

RICHARDSON (Charles W.). **Malaria simulating Diseases of the Mastoid and Frontal Sinus.**—*Ann. Otol. Rhinol. & Laryngol.* 1916. Sept. Vol. 25. No. 3, pp. 602–606.

A precise and sufficiently full account of two cases one of which simulated mastoiditis, the other disease of the frontal sinus.

In the first case the symptoms, as well as the antecedent history of acute suppurative otitis with rupture of the membrana tympani, were strongly suggestive of suppuration in the mastoid with intracranial complications. Examination of the blood revealed malaria parasites, and the patient was treated satisfactorily with quinine, the temperature falling to normal in a few days. The patient returned to hospital some weeks later for eye troubles (optic papillitis), which had been present from the first but had not improved altogether.

In the second case the subjective symptoms strongly suggested disease of the frontal sinus, but the naso-pharynx was found to be quite normal. When the blood was examined scarcely one cell was free of parasites. Under quinine the frontal pains disappeared and the number of parasites was much diminished.

A. A.

CASON (T. Z.) & BIRGE (E. G.). **Pernicious Malaria: a Report of a Case.**—*Jl. Amer. Med. Assoc.* 1917. May 19. Vol. 68. No. 20. p. 1475. With 1 chart.

Patient, a white man, age 33, was admitted comatose, with abdomen tympanitic. He had been taken ill about three months before and had

had occasional headaches since. There was anaemia, some oedema, and slight enlargement and tenderness of the spleen. The day after admission the temperature was subnormal. There was no history of chills, but the patient had taken much quinine during the past few years. The blood was examined on five occasions during the six days following admission, and for some time suggested a condition of pernicious anaemia, but finally, after a slight rise of temperature, numerous rings were found. As soon as the diagnosis was established quinine was given, with a rapidly favourable result.

A. A.

PISSAVY (A.) & QUIQUANDON (J.). **État léthargique consécutif à un accès paludéen.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. May 31. 3 Ser. Vol. 33. No. 17–18. pp. 717–719.

The patient, age 22, had enjoyed good health without any nervous abnormalities, until he contracted malarial fever in Macedonia. After his return to France he had slight and distant relapses of fever. Being admitted to hospital for a trivial affection of the nasopharynx, more than five months after his return, he had a typical malarial paroxysm, with a temperature rising to 106·8° Fahr., delirium and convulsions, ending in a prolonged critical sleep. During the sleep the patient was insensible to all stimuli, except that he swallowed liquids introduced into the mouth and passed water when the urinal was placed in contact; and the temperature fell to 100° F.

When seen by the authors on the third day he was in a state of lethargy, with the eyes firmly shut and the skin absolutely anaesthetic; but he responded by appropriate passive movements to certain orders —and subsequently, on recovery, he stated that he had heard all that was going on. In this hysteric condition he remained for a week, after which he began to answer in monosyllables and gradually regained sensibility; but it was not until the 31st day that he recovered his normal state entirely.

The patient was extremely intelligent, but though he admitted having once attended an exhibition of hypnotism he had no knowledge of Babinski phenomena.

A. A.

HISTROWITZ (H.). **Zur Klinik des Tertianfiebers.**—*Deut. Med. Woch.* 1917. Oct. 25. Vol. 43. No. 43. pp. 1356–1359. **With 6 charts.**

Six cases of verified benign tertian illustrating difficulties of diagnosis not altogether novel. In one case there were neither symptoms, except splenic tumour, nor manifest parasites, until some days after the patient received an anti-typhoid vaccination. In another the conspicuous symptoms, after initial fever and diarrhoea, were retention and persistent dysuria. A third simulated typhoid. In another, which proved to be a double tertian, the early diagnosis hesitated between appendicitis, cholecystitis, and liver abscess. A fifth, where fever was accompanied with pain and swelling of the dorsum of the feet, was thought to be a subacute polyarthritis that had kindled latent malaria. Conversely in a case of obvious tertian, which, though treated with quinine, passed into a typhoid state and ended fatally after a month, malaria was believed to have revived an ulcerative endocarditis revealed at the post-mortem.

A. G. B.

JEANSELME (E.). **Sur une forme de tremblement liée à l'infection paludéenne. (Présentation d'un malade.)**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Apr. 5. 3 Ser. Vol. 33. No. 11–12. pp. 557–559.

The tremors are not exhibited by the patient when he lies supine with all the muscles relaxed; but if the head then be raised on a pillow it oscillates and jerks, and there is nystagmus and rhythmical blinking; and if the patient is placed in a sitting posture, with the legs dangling, the whole body is agitated by tremors. There are no other symptoms. According to the patient the condition has lasted 16 or 18 days, and is a survival of the shivering stage of a malarial paroxysm. There is a definite history of recent and still existent malarial infection. The patient had a chancre six years ago, but was properly treated by modern methods and afterwards showed a negative Wassermann. At present his Wassermann reaction is positive [possibly, it may be surmised. due to malarial infection].

A. A.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. 1917. Sept. Vol. 29. No. 3. pp. 354–356. **Provisional Instructions for the Treatment of Cases of Malaria in the United Kingdom.**

Revised instructions for the treatment of malaria based upon experience accumulated in special malaria wards in England. This digested experience confirms the general efficacy of quinine in daily quantities of 20 to 30 grains for subduing fever and reducing non-sexual parasites, and of quinine combined with arsenic and iron for relieving anaemia in chronic cases, and the general inefficacy of quinine, however administered (as well as of any of more than 20 other kinds of treatment tried) for the permanent eradication of malarial infection.

No noteworthy difference has been established between any of the customary methods of giving quinine; but in large doses acid solution of the sulphate seems perhaps to be less agreeable to the stomach than the hydrochloride, and generally large quantities of quinine are better borne when given partly by intramuscular injection and partly by the mouth, or if distributed through the day in small doses.

In the opinion of many of the specially-qualified medical officers anaemic and debilitated cases treated continuously as in-patients have not done so well as when treated as out-patients on full or light duty.

As regards the prevention of relapses, men taking 5 grains of quinine daily have relapsed to the extent of 30 per cent., but men taking 10 grains faily, or taking 20 grains in two several days of every week, have shown a much smaller percentage of relapses, and men taking 30 grains daily and doing full duty in camp have not relapsed or suffered inconvenience; perhaps the optimum dosage is 60 grains weekly, and it seems not to be material whether this amount be given in large doses on two or three several days of the week or in smaller doses every day

A. A.

Unley-Owen (A.). **Treatment of Malaria.**—*S. African Med. Rec.* 1917. Sept. 22. Vol. 15. No. 18. pp. 279–280.

Nothing very novel, except that special subsidiary treatment is advocated for the myocarditis which, in the author's experience, is common in subtertian cases. Since 1908 the author has habitually used atoxyl or soamin in the treatment of subtertian and malignant tertian. In Rhodesia some years ago he gave intravenous injections of tartar emetic a fair trial, but "without any beneficial result." In Rhodesia also he noticed that people who were accustomed during the wet season to take regularly a nocturnal dose of 5 grains of quinine were not immune against or even resistant to malaria.

A. A.

Marchoux (E.). **Le paludisme de Salonique. Traitement.**—*Bull. Acad. Med.* 1917. Aug. 7. 3 Ser. Vol. 78. Year 81. No. 31. pp. 112–114.

The author, merely stating his conclusions in this paper, thinks that too much importance has been attributed to subcutaneous and intravenous injections of highly soluble salts of quinine, and that oral administration of the more slowly absorbed forms, such as quinine alkaloid and basic quinine, is preferable. The sexual phases of the parasite are resistant to quinine, but cannot therefore be regarded as cysts: "after 14 days, on an average, they divide like an ordinary schizont, by a sort of parthenogenesis," hence recovery from an attack of fever is followed by a relapse in 14 days; or "if the parthenogenetic generation be scanty the relapse fails and the apyretic interval continues for a month." By administration of quinine two or three days before the expected relapse—the exact time to be determined by daily examination of the blood—the patient can be sterilized. The daily administration of quinine is inconvenient, wasteful, and useless; 3 one-gramme doses a week are sufficient to catch all the new generations of the parasite.

A. A.

Abrami (P.). **Le paludisme primaire en Macédoine et son traitement.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Mar. 22. 3 Ser. Vol. 33. No. 9–10. pp. 500–519.

The author's practical conclusions, which have already been summarised in the *Bulletin* [Vol. 10, p. 161], are that Macedonian malaria is comparable with the severe tropical forms of the disease; that recent infections can be cured in 66 per cent. of cases if treated at once, before the formation of crescents, by daily administration of 3 grammes of quinine—preferably the hydrochlorate, by subcutaneous injection, in combination with urethane and adrenaline; that chronic infections should be treated like recent infections during the actual relapses only, and that after a relapse the treatment should be absolute rest, nourishing diet, and administration of arsenic and iron, the patient being isolated, kept under a mosquito net, and sent away to a healthy climate as soon as possible.

A. A.

JAMES (S. P.). **The Intravenous Administration of Quinine Bihydrochloride in Malaria, and a Remark upon the Form of the Parasite responsible for True Relapses (War Office Investigations).**—*Jl. Roy. Army Med. Corps.* 1917. Sept. Vol. 29. No. 3. pp. 317–322.

The object of the investigation recorded in this paper was to ascertain whether the intravenous method is more preclusive of relapses than other methods of administering quinine. The cases selected for experiment were obstinate relapses in spite of potent quinine-treatment by mouth or by intramuscular injection, all of them being pure benign tertian, except one, where there was an entry of subtertian parasites in the annals.

The methods of investigation are described and the results are tabulated. The results, *inter alia*, confirm the established proposition (J. D. THOMSON) that a single intravenous injection of 15 grains of quinine bihydrochloride at the time of a rigor is soon followed by abatement of fever, and by the disappearance of all the non-sexual forms of the parasite from the peripheral blood (without appreciable diminution of the sexual forms) provided that only one generation of parasites is present: where 2 or more progenies are present the same dose must be repeated in accordance with the circumstances. They show also that there is a class of cases where this dose even when repeated daily for ten days does not prevent relapses.

In these repeatedly-relapsing cases the infection is observed to be particularly heavy, and among the large number of gametocytes present are said to be some forms of indefinable sex. The author thinks it a plausible working hypothesis that these assumed indeterminates may be the dormant, or persistent, quinine-resisting forms of the parasites; since in cases of true relapse the same doubtful forms are those earliest found in the peripheral blood, and in cases that relapse during or very soon after energetic quinine treatment somewhat similar forms may be observed in films of spleen blood.

A. A.

TEICHMANN (Friedrich). **Klinische und experimentelle Studien über die Chiningewöhnung des menschlichen Körpers und die scheinbare Chininfestigkeit der Malariaplasmodien.** [Clinical and Experimental Studies on Quinine Habituation and Apparent Quinine-Fastness of Malarial Plasmodia.]—*Deut. Med. Woch.* 1917. Aug. 30. Vol. 43. No. 35. pp. 1092–1096.

The author, who writes from a German military hospital in Turkey, has experienced like others the failure of quinine as a prophylactic for malaria and the recalcitrance of many cases to treatment extending even over months, both of the benign and subtertian varieties. He has found that patients who had not taken quinine responded readily to treatment and remained free from parasites for at least 5–6 weeks, whereas in those who had taken quinine regularly parasites appeared as soon as the quinine was left off or even persisted during its administration. In 24 cases of the last group, treated for 4 or 5 months for tropical malaria, benign tertian parasites appeared at the end of the time, though recent infection was out of the question. He cites the usual explanations—inefficient prophylaxis, quinine-fast parasites, low resistance of the patients, insufficient treatment—and rejects them as unsatisfactory, but notes that many patients suffered from enteritis and dysentery so that the quinine was incompletely absorbed. He has followed NOCHT's method of quinine administration, i.e., fractional doses by mouth, 1-1·5 or even 2 gm. daily, continued for 8 days after the fall of temperature, and after treatment with like doses at increasing intervals; intravenous injection also was often used.

The author believed the cause of the failure to lie in the giving of quinine over long periods first for prophylaxis and then in treatment, which must lead to quinine habituation of the body and a reduction and even disappearance of its specific action. Certain cell groups and organs under the continual toxic stimulus of this, as of other, plant alkaloids are enabled to fix continually increasing quanitites, so that less and less is available in the circulation. Authors are agreed that about 40 per cent. of the drug can be recovered from the urine, the rest being destroyed; this 40 per cent must be the active portion, and from the quantity excreted one may conclude how much was available in the blood.

To test his hypothesis the author examined the blood and urine of a "large number" of patients. Quinine was given intravenously and at definite intervals blood was withdrawn from a vein and after treatment with soda and ether tested with Giemsa's reagent, which yields a yellow coloration or a cloud according to the quantity of the alkaloid; the urine was similarly tested. It was sought to find whether quinine habitués and non-quinine habitués gave different results. *Examples are given and the following conclusions are reached.* (1) Whereas in the blood of non-quinine habitués considerable quantities of quinine may be found, in the blood of quinine habitués after a definite interval it is not demonstrable or only in very small quantities. (2) In the second class surprisingly little quinine is excreted in the urine; excretion begins later and ends much earlier than in the first class. (3) Continuous investigation of the same case under quinine treatment shows that excretion gets less day by day and in some instances eventually reaches zero. (4) By gradually increasing the dose in the course of treatment one can keep the excretion at approximately the same level.

For quinine to exert its specific action a certain concentration in the blood is necessary, but in quinine habitués smaller and smaller quantities of quinine are there. The quinine fastness of the parasites is only apparent; they are still sensitive, but the quinine at disposal is insufficient to kill them. It remained to test these conclusions by gradually raising the dose of quinine; at the same time lessening the quinine habituation by leaving off the drug for suitable intervals. Patients were therefore treated thus:—Two-four weeks, according to the degree of quinine habituation, no quinine; ten days quinine, 3 days 1·2 gm., 3 days 1·5 gm., 4 days 1·8 gm.; 8 days pause; ten days quinine treatment as above; 10-12 days pause; ten days treatment; lastly, 1·2 gm. of quinine on two successive days in each week for 6 weeks. It is stated that this method has been completely successful in obstinate cases. The malarial parasites disappeared; the general condition improved; the haemoglobin percentage reached the normal; and in an observation period up to 6 weeks there were no relapses. The author does not assume that they are definitively cured but thinks that by the early application of the method to quinine habitués a large number may recover. To the objection that it is dangerous to leave these patients without quinine he replies that such relapses as occur are mild and that the preliminary long cessation is applied only to chronic cases with parasites always in the blood; the patients are, he finds, none the worse, and some improve, and it is always possible to cut short an attack by neosalvarsan or methylene blue.

In conclusion he says that he is not against prophylactic quinine; on the contrary he urges its systematic and careful use, but believes that if malaria breaks out in such cases it should be treated with intermittent quinine in rising doses.

A. G. B.

ROGERS (Leonard). **An Experimental Investigation of the Suitability of the More Soluble Salts of Quinine and Cinchonine for Intravenous Injection.**—*Brit. Med. Jl.* 1917. Sept. 22. pp. 381–384.

The author tabulates some experiments made with several salts of quinine and cinchona alkaloids to determine their relative effect upon human blood-serum, and their relative toxicity to *Paramoecium* and on the other hand to rabbits and pigeons. His conclusions are that quinine lactate and periodide and hydroquinine hydrochloride are unsafe, as even in dilute solution (1 in 100) they cause a precipitate in serum (the two first also being manifestly more toxic to pigeons), and that, on the whole, the most suitable salts for intravenous injection are the acid hydrobromide and the bihydrochloride of quinine.

The author states that his clinical experience with intravenous injections of these two salts in malaria cases has been limited, but that, so far, with half-gram doses daily for three or four days, the effect upon the fever and upon the parasites has not been more marked than with administration by the mouth.

In confirmed cases of relapse the author's own experience is that the daily administration of 10 grains of quinine, in either one or two doses, for not less than three and preferably for six months is the most satisfactory treatment; but no particulars of cases are given.

A. A.

WURMFELD (Armin). **Ueber Optochin-Behandlung der Malaria.**—*Wien. Klin. Woch.* 1917. June 21. Vol. 30. No. 25. pp. 783–784.

The author working in a large hospital for malarial patients was dissatisfied at the end of the malarial season with quinine, whether given by mouth or by the veins—he had many cases of thrombosis and infiltration. He therefore tried optochin, or aethylhydrocuprein, on 26 cases, which were under observation for two months, with results that he regards as extremely good. All were severe cases which either had resisted treatment for months and still had febrile attacks or were obstinate parasite carriers. One gramme of the hydrochloride was given daily for two or for three days in five 4-hourly doses, after which all treatment was suspended. The cases of benign tertian so treated almost without exception lost their parasites promptly, were free two months later, and improved very much in their general state. In the case of tropical malaria only three out of seven cases responded in like manner, higher doses notwithstanding: but the author says that the later attacks were weaker and more spaced. He was on the look-out for disturbances of vision and questioned the patients frequently for subjective signs. The trials are to be continued. [See also this *Bulletin,* Vol. 3, p. 435, Vol. 5, p. 50; Vol. 6, p. 334; and Vol. 9, p. 305.]

A. G. B.

SINTON (J. A.). **Quinine Idiosyncracy in Five Cases.**—*Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 323–324.

A European after 40 grains of quinine acid hydrochloride taken in the course of two days had "marked oedema of the face and eyelids." Three Indians after doses of 10, 5, and 5 grains of quinine sulphate had an urticarial rash all over the body and in two of them there was severe vomiting and diarrhoea. In the fifth case, a Jat, there was a history of semi-coma after quinine. He received cinchonidine sulphate, 5 grs. in solution.

> "After fifteen minutes he was carried back to hospital in a collapsed condition. He was semi-comatose, his face and conjunctivae were very congested, his pupils dilated, and his eyes turned up. His skin was cold and clammy, his pulse imperceptible at the wrist but heart-beats 80, and his temperature 95° F. Vomiting and diarrhoea were severe. An ounce of brandy was given and hot bottles applied. After about twenty minutes he became conscious and complained of chilliness and severe headache. In a few hours' time an urticarial rash appeared on the body. His urine contained no albumen or blood. On the next day he had recovered except for headache and buzzing in the ears which lasted several days."

For a similar case see this *Bulletin,* Vol. 2, p. 152. McGILCHRIST found cinchonidine the least lethal of the cinchona alkaloids.

A. G. B.

RAVAUT (Paul) & DE KERDREL (A.). **Essai sur le traitement mixte du paludisme par les cures arsénico-quiniques.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Mar. 22. 3 Ser. Vol. 33. No. 9–10. pp. 468–473.

An exposition, illustrated with abstracts of cases, of the immediate good effects of the mixed arsenico-quinine treatment of obstinate forms of malaria. The authors have also used this treatment in cases of haematuria of malarial origin, giving the quinine by the mouth, as they have observed in such cases that the intravenous injection of quinine increases the albumen in the urine.

A. A.

BITTORF. **Die kombinierte Salvarsan-Chininbehandlung der Malariarezidive.** [Salvarsan and Quinine in Malarial Relapses.]—*Münch. Med. Woch.* 1917. Sept. 11. Vol. 64. No. 37. pp. 1216–1217. With 4 charts.

The author is attached to a military hospital at Leipzig. His method of treatment is as follows:—At the height of the first relapse he gives 0·45–0·6 gm. neosalvarsan; this is followed by a course of NOCHT's quinine treatment during which 2–5 times at 14 day intervals salvarsan injections are given, 0·3–0·6 gm., chiefly on quinine free days. Many severe cases of anaemia and cachexia improved surprisingly quickly. No difference between tropical and tertian malaria in this respect was noticed. Neosalvarsan was observed to provoke a relapse; the drug is indeed recommended for this purpose.

A. G. B.

NEUSCHLOSZ (S.). i. **Ueber die kombinierte Neosalvarsan-Chinintherapie bei tropischer Malaria und ihre pharmakodynamischen Grundlagen.** [The Combined Neosalvarsan-Quinine Treatment of Tropical Malaria and its Pharmacodynamic Foundation.]—*Münch. Med. Woch.* 1917. Sept. 11. Vol. 64. No. 37. pp. 1217–1219. With 3 charts.

ii. **Erfahrungen über die Kombination des Chinin mit verschiedenen Arsenverbindungen bei Malaria tropica.** [The Combination of Quinine and Various Arsenic Compounds in Tropical Malaria.]—*Ibid.* Sept. 25. No. 39. pp. 1284–1285. With 2 charts.

These notes come from a "malarial laboratory" in Slavonia, in the hospital attached to which several thousand cases of tropical malaria have been treated. While many cases yielded to parenteral quinine others, especially chronic cases towards the end of the malarial season, did not. A course of quinine and neosalvarsan was therefore tried in numerous cases with apparently favourable results but as the observation period did not exceed 15–20 days, followed by a "provocative" injection of milk, details are not here given. Similar results were obtained when more readily obtainable salts of arsenic were substituted for neosalvarsan, and the author concludes that this and other arsenical preparations have merely a determinative influence by preventing the fixation or destruction of arsenic by the tissues. Curves of the course of excretion of quinine in the urine of quinine-treated cases, before and after an injection of neosalvarsan, are held to support this idea.

A. G. B.

PENDE (N.). **Le ipodermoclisi di dosi generose di chinino in soluzione fisiologica adrenalinizzata, quale metodo elettivo di cura della malaria nei combattenti.** [The Employment of Large Hypodermic Doses of Quinine in Adrenalized Salt-Solution as a Method of Election for the Treatment of Malaria in Soldiers.]—*Policlinico.* Sez. Prat. 1917. Nov. 4. Vol. 24. No. 45. pp. 1329–1333.

The author recommends the following method for the treatment of malaria in soldiers. Sterilized physiological salt-solution is supplied in capsules containing 250 grammes each, as one of the medical stores of the Italian army. An india-rubber tube 1½ metres in length, and of suitable calibre, is sterilized by boiling, and one end is attached to a hypodermic needle. The pointed end of a capsule containing salt-solution is then cut off with a file, and the other end of the rubber tube is fitted on to the capsule. The capsule being then inverted, the other end is also cut off and a solution of 2 grammes of bi-hydrochlorate of quinine (equal to 1·64 grammes of alkaloid), along with half a cubic centimetre of commercial solution of adrenalin (= ½ milligramme of adrenalin), is introduced into the capsule by means of a syringe. The capsule being then held by an assistant, at the height of the shoulder above the patient's bed, the needle attached to the lower end of the tube is inserted under the skin of the front of the patient's thigh, and the solution allowed to flow in. The process of injection takes from 10 to 20 minutes, and is remarkably free from pain.

The author's routine plan of administration is as follows:—A first injection is given some 6 or 7 hours before an expected paroxysm of fever and is followed by a second one within 15 to 24 hours. In grave cases the interval is reduced to 12 hours. The patient is then kept without quinine for 5 to 6 days, after which a third dose is given, followed by a fourth at a similar interval. After this, quinine is given for 2 days by the mouth, in a dose of 2 to 3 grammes a day, in capsules, followed by an interval without quinine of a week, on KOCH's plan. This treatment is kept up for 2 months, the patient being placed at the same time on a supplementary course of iron and arsenic. The recovery of patients treated on this system is said to be remarkably quick and permanent, so as to obviate the necessity for sending them on furlough. The author has never seen any albuminuria resulting, and the intention of the adrenalin is to prevent the vaso-motor collapse which might ensue as the result of injecting such large doses of quinine.

J. B. N.

ERBEN (Franz). **Bemerkungen zur Malariafrage aus Albanien.**—*Wien. Klin. Woch.* 1917. July. Vol. 30. No. 29. pp. 909–910.

The author asserts (but gives no figures) that a mixture of quinine bichloride with sublimate or neosalvarsan gives better results than the quinine alone. The following course is strongly recommended:—First neosalvarsan-quinine intravenously (0·6 gm. neosalvarsan and 1 gm. quinine bichloride), on the next three days a quinine-sublimate injection (1 gm. quinine bichloride and 0.03 gm. sublimate), then a pause of eight days, a second three days' quinine-sublimate course, and another eight days' pause, a third three day quinine-sublimate course, and finally a quinine-neosalvarsan injection. He says that quinine resistant cases yield to this method.

A. G. B.

STEPHENS (J. W. W.), YORKE (W.), BLACKLOCK (B.), MACFIE (J. W. S.), COOPER (C. Forster) & CARTER (H. F.). **Studies in the Treatment of Malaria. V. Intramuscular Injections of Quinine Alkaloid in Simple Tertian Malaria.**—*Ann. Trop. Med. & Parasit.* 1917. Aug. 23. Vol. 11. No. 2. pp. 173–182. With 5 charts.

The 38 cases selected for experimental observation were adult males infected with simple tertian in Macedonia at least nine months before, and all had had more or less quinine. The intramuscular injection used was an insoluble form of quinine, to test whether a presumed more gradual absorption would give evidence of a more prolonged therapeutic effect; it was made by dissolving 1 gm. of quinine alkaloid in 1 cc. of 90 per cent. alcohol and making up the volume to 3 cc. with sesamum oil. The results are recorded in tabular form up to the twenty-seventh day, and the conclusion drawn is that a single injection containing 15 to 30 grains of this alkaloid, or a daily injection in two successive days, stops the febrile paroxysms and causes the disappearance of all stages of the parasites from the cutaneous blood for a time: in the great majority of cases a relapse occurs within two to four weeks.

Subcutaneous injections of the solution caused sloughing. Intramuscular injections up to 4 cc. caused slight and temporary pain, and in larger quantities caused more severe and recurring pain; there might be diffuse swelling at the site, but no suppuration.

A. A.

STEPHENS (J. W. W.), YORKE (W.), BLACKLOCK (B.), MACFIE (J. W. S.) & COOPER (C. Forster). **Studies in the Treatment of Malaria. III. Intravenous Injections of Quinine Bihydrochloride. IV. Intramuscular Injections of Amylopsin and Trypsin in Simple Tertian Malaria.**—*Ann. Trop. Med. & Parasit.* 1917. Aug. 23. Vol. 11. No. 2. pp. 149–164. With 8 charts; pp. 165–171. With 10 charts.

Thirty cases—simple tertian 21, malignant tertian 7, double infections 2—were treated by intravenous injections of quinine bihydrochloride in 10 per cent. solution in normal saline, and the blood was systematically examined. The results are recorded in tabular form, and from them the authors draw the following conclusions: that, in simple tertian, intravenous injections of 10 to 15 grains—either one injection or a series of six—effect a cessation of febrile paroxysms and disappearance of the parasites from the cutaneous blood for a time, relapses occurring at approximately the same interval after the conclusion of treatment, whether with one or six injections; but that in malignant tertian after exactly the same conditions of treatment, the parasites did not disappear.

In the entire series of 127 injections thrombosis occurred in four patients only—and six instances altogether, but no other symptom worthy of note.

Ten cases of simple tertian, all adult males infected in Macedonia at least six months before who had had more or less quinine afterwards, were treated with intramuscular injections of amylopsin and trypsin—one ampoule of Fairchild Bros. and Foster's preparations of each with normal saline to 10 cc. Temperatures were taken and blood examined daily. The results are recorded in tabular form and the authors conclude that such injections were of no value. Some swelling and tenderness occurred at the site of injection.

A. A.

FALCONER (A. W.) & ANDERSON (A. G.). **Notes on the Treatment of Subtertian Cerebral Malaria with Quinine and Galyl.**—*Lancet.* 1917. Sept. 29. pp. 486–488.

The authors give short abstracts of nine severe cases of subtertian malaria in the treatment of which galyl was employed: seven had received quinine in various forms before galyl was used, one was treated with galyl alone, and one received quinine as an ultimatum after the condition had been improved but not completely restored by galyl.

They conclude that in subtertian malaria when it is resistent to quinine the combination of galyl gives encouraging results, and that in cases where some overpowering idiosyncrasy prohibits the use of quinine galyl may prove to be a valuable substitute.

Galyl was given by intravenous injection in doses ranging from 0·2 to 0·4 gm., without danger.

A. A.

ORENSTEIN (A. J.) & WATKINS-PITCHFORD (W.). **Observations on the Effect of Intravenous Injections of Tartar Emetic in Cases of Malaria.**—*Med. Jl. S. Africa.* 1917. Apr. Vol. 12. No. 9. pp. 135–140.

The authors give separate summaries of 25 cases of malaria—24 subtertian, 1 benign tertian—treated with intravenous injections of tartar emetic and with large doses of quinine, and carefully observed. The injections consisted of 1 up to 5 cc. of a 4 per cent. solution of tartar emetic in 2 per cent. aqueous carbolic acid, diluted immediately before use with 4 volumes of normal saline: the number of such injections ranged from 1 (in 11 cases) up to 4 (in 4 cases). The quinine was given in acid solution, usually by the mouth in doses of 10 or 15 grains of the hydrochloride three times a day.

In 22 cases—all subtertian—the treatment with tartar emetic was undertaken immediately, or almost immediately, after discontinuation of the routine quinine treatment: in 3 cases—2 subtertian, 1 benign tertian—the treatment with tartar emetic was followed by the routine quinine treatment.

With regard to the 22 subtertians treated with quinine alone to begin with and tartar emetic alone finally, the summaries show that only crescents were found remaining in the blood after terms of quinine treatment ranging from 6 to 49 days, but these were found no more after the tartar emetic treatment had been substituted.

With regard to the 2 subtertians treated with tartar emetic alone to begin with, the summaries show that crescents and rings (1 case) or rings only (1 case) were found in the blood from 5 to 8 days after administration of tartar emetic, and that after the subsequent administration of quinine no forms of the parasite were discovered at all.

With regard to the single case of benign tertian, trophozoites alone were found before and 5 days after an injection of tartar emetic, but they could not be discovered after following up with quinine. (In one of the subtertian cases that had received quinine and tartar emetic an attack of benign tertian supervened, it is noted.)

The results of the successive blood examinations are given qualitatively, not quantitatively, as regards parasites.

The authors are of opinion that their observations support the thesis of ROGERS as to the employment of tartar emetic for cleansing human carriers from the propagative forms of the subtertian parasite. They are inclined, both in the title of their paper and in the frequent iteration of the adjective "unsuccessful" in respect of their quinine treatment, to attribute the disappearance of crescents to the tartar emetic. But this inference is not justified by any of the five canonical methods for the inductive elimination of cause and effect. Taking the detached statements of the observed facts as the authors present them, they do not exclude quinine from the antecedent causes or part causes of the effects recorded, and although they suggest the possibility of tartar emetic having been part of the cause of the phenomena observed, they certainly do not separate tartar emetic as the sole sufficient cause.

A. A.

Levy (M. D.) & Wall (Dick P.). **The Use of Tartar Emetic in the Treatment of Malaria—Preliminary Report.**—*Interstate Med. Jl.* 1917. Sept. Vol. 24. No. 9. pp. 858–860.

Short abstracts of three chronic cases of benign tertian treated by intravenous injections of tartar emetic: the doses ranged from 2 to 4 cc. of a two per cent. solution, and the number of injections administered in a single case were 1, 3, and 4. The results were reduction of temperature and apparent relief to the patient, but not disappearance of the parasites. Ultimately the patients were all put on quinine and urea hydrochloride, after the tartar emetic had been stopped.

A. A.

Appel (Leo). **Zur Behandlung der Malaria mit Methylenblau und Salvarsan.**—*Deut. Med. Woch.* 1917. Oct. 25. Vol. 43. No. 43. pp. 1359–1360.

The author, working at Sarajevo, found that these substances cannot be administered together owing to decomposition of the neosalvarsan; but if the methylene blue be injected intravenously, and then, after an interval of 4 hours, the neosalvarsan, the results—so far as their recency justifies a conclusion—are better than quinine or quinine and neosalvarsan, particularly with benign tertian. Over 100 cases—severe tertian, subtertian, and mixed infections—have thus been treated. In 90 per cent. the parasites disappeared after the first double injection, with 20 per cent. of relapses; in either case the treatment is repeated twice at ten days' interval. The technique is as follows: 2 gm. of medicinal, chemically pure, zinc free methylene blue is completely dissolved, by boiling, in 100 gm. of distilled water, filtered, and again sterilised for keeping; 10 cc. of this solution, warmed, is slowly injected. This is followed four hours later by 0·45 gm. neosalvarsan in 10 cc. of water. Lately the author has given 3 daily methylene blue injections, the last of them followed by neosalvarsan.

The injection of methylene blue turns the skin of the whole body bluish-green, which fades after 15 minutes. Burning in the throat and faintness may occur. Contra-indications must be looked for as for salvarsan.

A. C. B.

MONTPELLIER (J.). **Essai de traitement du paludisme par le luargol (102 de Danysz).**—*Paris Med.* 1917. June 9. Vol. 7. No. 23. pp. 498–499.

Attracted by its success in syphilis, the author tried luargol, in repeated small doses (·05 to ·15 gm.) by intravenous injection, in malaria In 7 cases of benign tertian the parasites disappeared from the circulation very quickly. The author's account of its action in 3 cases of malignant tertian is somewhat ambiguous: crescents were not affected, but it is clearly stated that in one of the cases the temperature, which had resisted quinine and hectine, was brought down to normal. In one case of mixed benign and malignant tertian only the parasites of the former disappeared.

Always, apart from any direct effect upon the parasites, there followed an abundant and rapid repair of the blood, the ratio of red cells being increased, in 15 days, from 500,000 to 1,000,000, and of haemoglobin from 5 per cent to 18 per cent.

A. A.

WILLIS (Horace). **A New "Specific" for Malaria, Etc.**—*Indian Med. Gaz.* 1917. July. Vol. 52. No. 7. pp. 230–231.

The author makes it known that it is only with the greatest diffidence and from reluctance to incur the imputation of criminal modesty that he has at length made up his mind to speak of a cure for malaria 'invented" by himself, and practised by himself with unvarying success for 16 years, ever since he discovered that persistence in the use of quinine was "a waste of time and life."

The author points out that his invention is by no means an empirical one. It is based partly on the argument that, since malaria parasites destroy the red blood cells the natural responsory is not quinine, which only aids the destruction, but something that repairs and refreshes the blood; and partly on the hypothesis that "as the disease was indigenous to the country so must also the remedy be."

The indigenous blood-restoratives selected by the author, after research in old vernacular liturature, are "the raw juice of a certain species of lemon, a quantity of crude biborate of sodium, and the sulphate, phosphate, and chloride of sodium," in combination. These substances, however, are only useful in their crude natural form, and the combination must be made by a particular firm of pharmacists in accordance with the author's "crude formula"; corresponding preparations of the British Pharmacopoiea are useless, and the nature of the necessary ingredients is such that they cannot be compounded by the ordinary practitioner.

The original specific has, in the author's opinion, been perhaps improved by the later addition of iron and vinum antimoniale.

A. A.

JEANSELME. **Du groupement en colonies agricoles des soldats paludéens, momentanément inaptes.**—*Bull. Acad. Méd.* 1917. July 10. 3 Ser. Vol. 78. Year 81. No. 28. pp. 21–24.

A sagacious argument for segregating military malaria-convalescents in agricultural colonies, in districts free from Anopheles, under proper medical supervision. In rural surroundings, and in properly apportioned rustic occupations, the convalescents would improve both in body and soul, and would also be doing something for their keep.

A. A.

DUDGEON (Leonard S.) & CLARKE (Cecil). **A Contribution to the Microscopical Histology of Malaria, as occurring in the Salonika Force in 1916, and a Comparison of these Findings with Certain Clinical Phenomena.**—*Lancet.* 1917. Aug. 4. pp. 153–156.

These microscopical investigations were undertaken mainly for the purpose of throwing light upon the cause of death in rapidly fatal cases of malaria and on the cardio-vascular derangement so frequently observed in the malaria of the Macedonian armies.

Examination of the heart muscle in six cases revealed fatty degeneration in all, and diffuse fatty change similar to that occurring in acute diphtheria in five: in most cases also blocking of the capillaries with infected red-cells was noted.

In the adrenal glands general congestion, and a loss of the characteristics lipoids, were constant features: among the other pathological changes noticed were deficiency of the medullary chromaffin, abundance of the deep cortical pigment, haemorrhage, phagocytosis of red cells, thrombosis and necrosis, and vacuolation of the cortex.

The brain, examined in three cases of fatal coma, showed engorgement of capillaries and arterioles, degeneration of nerve-cells, and—particularly in the white matter—thrombosis: in 2 cases the red-cells in the engorged vessels were heavily parasitised; but in the third case, which had been treated very energetically with quinine, no parasites could be found, so that the action of something apart from parasites is postulated—possibly a toxin.

In the spleen congestion and excessive phagocytosis of red blood cells was always observed, and no evidence of amyloid degeneration was ever obtained. Among other changes found were necrosis chiefly of the pulp but sometimes of the Malphighian corpuscles, capillary thrombosis, and infarction. Necrosis of the Malphigian corpuscles was particularly pronounced in a case of blackwater fever.

The liver showed deposits of pigment, fatty change, thrombosis, and focal necrosis, but no amyloid change. The infection of the red-cells in the thrombi was not so much marked as in the other organs. The bile, examined in a considerable number of cases, was found to be sterile. In a case of blackwater fever the fatty change and the necrotic foci were remarkably distributed in the central zones.

Among the pathological changes in the kidney thrombosis, necrosis, and fatty degeneration of the epithelium, particularly that of the convoluted tubules, were remarked. In one case there was diffuse and intense nephritis. In a case of blackwater fever the whole renal tissue showed extreme degeneration, and the tubules were blocked by clots or by thick granular deposit.

The intestines, examined in one case of pure uncomplicated malaria, showed congestion of mucosa and submucosa, scattered necroses of mucosa, microscopic ulceration, and in the muscularis large areas of mucoid degeneration.

A. A.

Mitzmain (M. Bruin). The Malaria Parasite in the Mosquito. The Effects of Low Temperature and other Factors on its Development.—*Public Health Rep.* 1917. Aug. 31. Vol. 32. No. 35. pp. 1400–1413.

The author's very carefully conducted experiments, which are fully described and tabulated, were designed to investigate the influence of what the author calls *intermittent* low temperature upon the development of the malaria parasite (subtertian) in the mosquito. Laboratory bred Anophelines after biting the human carrier were kept at diminishing temperatures indoors, and finally in outdoor cages in winter (November to mid-January), whence individuals were from time to time brought indoors, again kept for a time at higher temperatures (20° C. to 32° C.), and then examined.

The experiments show that although under such fluctuations of temperature the development of the parasite may proceed to certain stages, in some instances even to the sporoblast stage, the formation of perfect sporozoites did not take place—the term of observation being fixed at 70 days. The author therefore thinks it justifiable to suppose that mosquitoes ingesting gametocytes before winter sets in may become innocuous during hibernation.

In the course of his work the author obtained partial confirmation of Daniels' observation (*British Medical Journal,* 1901, January 26), that the infection of an individual mosquito is directly dependent upon the number of bites taken from the human carrier.

The author also notes, as possibly having some bearing on the question of infectivity, that crescents may pass away unchanged in the mosquito's dejecta: in one instance, where blood from the human carrier showed 63 crescents to 100 leucocytes. the proportion of crescents to leucocytes after passing through the mosquito was 87 to 100.

A. A.

Mitzmain (M. Bruin). *Anopheles punctipennis.* **A Note on its Ability to serve as a Host for** *Plasmodium falciparum.*—*Public Health Rep.* 1917. July 6. Vol. 32. No. 27. pp. 1081–1083.

The author now records that *Anopheles punctipennis* (which was known to be easily susceptible to infection with *Plasmodium vivax*) is easily infectible with *P. falciparum*: in a series of 16 mosquitoes of this species given a single feed, 1 became infected, and in a series of 36 given a variable number of feeds, 13 infections resulted.

The author summarises the known susceptibility of the common North American Anophelines as follows:—*A. quadrimaculatus* may serve as a host for all three species of malaria-parasites: *A. punctipennis* and *A. crucians* are susceptible to infection with *Plasmodium vivax* and *P. falciparum.*

A. A.

Roubaud (E.). Les anophèles français des régions non palustres sont-ils aptes à la transmission du paludisme?—*C. R. Acad. Sci.* 1917. Sept. 17. Vol. 165. No. 12. p. 401.

The author, wishing to satisfy himself as to the infectivity of the stock of *Anopheles maculipennis* native to the environs of Paris, which some people had taken leave to doubt, made experiments to that end. Experiments made between the 13th August and the 3rd September showed that the local mosquitoes of this species could be infected both with benign tertian and malignant tertian. Two experiments made [it may be presumed] after the 3rd September, were negative, and the author suggests that possibly the patient upon whom the insects were fed was not infective; but the atmospheric temperature at the time of these two unsuccessful experiments is not recorded.

A. A.

MESNIL (F.) & ROUBAUD (E.). **Sur la sensibilité du chimpanzé au Paludisme humain.**—*C. R. Acad. Sci.* 1917. July 2. Vol. 165. No. 1. pp. 39–41.

The authors inoculated a female chimpanzee, well acclimatised and well established in the laboratory, with blood containing numerous benign tertian parasites drawn from a patient who, however, had been treated with quinine. No result followed. The chimpanzee was then inoculated with 8–9 cc. of blood containing all stages of the benign tertian parasite, taken from a patient who had not been treated with quinine. Twelve days afterwards young schizonts were found in the animal's blood: on the thirteenth day, gametes: on the fourteenth day young schizonts of the second generation: on the fifteenth day numerous forms of the parasite. After the twenty-second day parasites could not be found.

The authors record that *typical* rosettes were not found at any time—only sporonts of a decidedly abnormal cast; and that no marked febrile reaction occurred.

In both experiments the infected blood was injected along with an equal quantity of physiological citrated water.

A. A.

RODHAIN (J.) & VAN DEN BRANDEN (F.). **Essais de transmission des parasites de la malaria à la roussette,** *Cynonycteris straminea.*—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 704–706

Attempts to infect some "flying-foxes" or fruit-eating bats (*Pteropidae*) of the species *Cynonycteris straminea* with the parasites of malignant tertian and quartan malaria, both by specific inoculation and by exposing them to the bites of Anopheles brought from a heavily-infected native village, were uniformly unsuccessful.

A. A.

CARNOT (Paul). **Sur la schizontolyse au cours de l'accès de paludisme. Action de sérum, des leucocytes, des extraits spléniques.**—*C. R. Soc. Biol.* 1917. July 28. Vol. 80. No. 15. pp. 685–688.

This is a continuation of a research [see this *Bulletin*, Vol. 10, p. 171] that claimed to show, to begin with, that the disappearance of the malarial parasites from the peripheral blood at the end of a paroxysm is not to be attributed merely to their imprisonment in the spleen, liver, and bone-marrow.

The present instalment describes, in addition to the technical methods of research employed, the subversive effect upon the parasites of malarial serum, malarial leucocyte extract, malarial spleen-juice, and ordinary spleen extract.

The destructive effect of serum obtained before a paroxysm is negligible, but that of serum obtained at the close is very well marked, its intensity being most evident in cases with a percentage of uninuclears above 40, and again in cases where the spleen is considerably enlarged.

The effect of leucocyte-extract is often more manifest than that of the corresponding serum, particularly when the leucocytes furnishing the extract are taken at the end of a paroxysm and the percentage of uninuclears is high

Spleen-products obtained by puncture appear to be superior in activity to serum and leucocytes from the corresponding peripheral blood. Spleen-extracts—those so far used in the experiments having been made from p.m. non-malarial spleens and from animal spleens—appear to be more effective than extracts of other organs.

The observed effects of bile, bile-salts, and divers antimalarial drugs will be reported in another instalment.

As regards technique: the parasites required for experiment (*P. vivax* in this connexion) were obtained by drawing infected blood at the very outset of a paroxysm, and then rapidly defibrinating and centrifugating. In separating the infected corpuscles nothing must be used but a serum that is known positively to be inert. The infected corpuscles, in serum to which dextrose may be added after BASS's method, are then distributed in small tubes, which are kept at a temperature of 38° C., along with the organic extracts, etc., whose action is to be observed. Films are made for observation, in the ordinary way, every half-hour. If the effect is intense it may be manifested in half-an-hour; but in other cases the effect may not be evident until three or even four hours.

The author emphasises the suggestive observation that sometimes in films where most of the parasites have disappeared, or have become profoundly altered for the worse, a few schizonts, either immature or ripe, may still be found quite unaffected.

A. A.

REINHARD (P.). **Ueber Provokation latenter Malaria durch Bestrahlung mit ultraviolettem Licht.** [The Activation of Latent Malaria by Irradiation with Ultraviolet Light.]—*Münch. Med. Woch.* 1917. Sept. 11. Vol. 64. No. 37. pp. 1193–1194.

The author remarks that in latent malaria quinine fails because the parasites are not in the general circulation; except in relapses they are inaccessible to energetic treatment unless one brings the schizonts into the circulation by artificial means. Studying the causes which produce relapses he concluded that they have in common a purely mechanical factor and this he takes to be an influence on the blood pressure. In this way regions which normally take little part in the circulation, such as the sinus of the spleen, might be swept with a strong current of blood carrying parasites into the general circulation. BACH has shown, he writes, that irradiation with the ultra-violet quartz lamp can lower blood pressure. He therefore applied the method to cases of latent malaria. The technique is described. The irradiation was broken off when schizonts appeared in the peripheral blood, usually after 4–5 days. Quinine was then given. 38 cases were so treated, of which 24 became positive and 14 remained negative, while of 34 controls (without quinine or irradiation) only 10 became positive; that is, of the cases rayed twice as many relapsed than of those not rayed. Moreover of the former class half relapsed within 7 days and five-sixths within 12, whereas with the controls the intervals were much longer, up to 3 weeks. Still better results were obtained with the "Aureole lamp" of Siemens and Halske.

A. G. B.

REICHENOW (Eduard). **Sobre el problema de la immunidad de los negros contra el paludismo.** [The Immunity of Negroes towards Malaria.]—*Bol. Inst. Nac. Higiene de Alfonso XIII.* 1917. Mar. 31. Vol. 13. No. 49. pp. 29–42.

The author, who is a German colonial surgeon, having had occasion to examine a village of Haussa negroes for the presence of sleeping sickness, took the opportunity to ascertain the percentage of those who showed malaria parasites in their blood, the total number of persons examined amounting to 176. The figures were as follows:—

Ages.	Number.	Percentage Infected.
0– 5	15	100
6–10	41	73·2
11–15	32	65·6
16–20	46	54·4
21–25	20	45
26–30	7	57·2
31–40	10	50
Over 40	5	40
	176	

The conclusion drawn is that there is no hereditary immunity among negroes to malaria, but a considerable degree of acquired immunity. According to the author, Haussas differ from other negroes in being able to state their age accurately.

J. B. N.

BERTARELLI. **Le specie differente di Malaria.** [The Different Forms of Malaria Parasite.]—*Gaz. d. Osp. e d. Clin.* 1916. Dec. 28. Vol. 37. No. 104. pp. 1633–1634.

A short article drawing attention to the anomalous forms of malaria parasite described by STEPHENS as *Plasmodium tenue*, by AHMED EMIN as *P. vivax* var. *minuta*, and by MARZINOWSKY as *P. caucasicum*. The author says that in 1911 on the Madeira River in Brazil he had himself met with cases of aestivo-autumnal fever in which the parasites were reduced to the size of an Anaplasma, being hardly more than a small mass of chromatin substance. In these cases doses of as much as 1½ grammes of quinine given by the mouth would prove ineffective.

J. B. N.

DE MELLO (Froilano). **Y a-t-il une nouvelle espèce de plasmodie malarienne à Gôa?**—*Bol. Ger. Med. e Farmacia.* Nova-Gôa. 1917. Apr. Vol. 4. No. 4. pp. 131–135.

After discussing clinical phenomena in certain cases of malarial fever that appear to justify the suspicion that something other than a double infection with any of the generally recognised species of malarial parasites is implicated in them, the author gives certain details of a case of quotidian fever which, though resisting quinine for some days, gradually yielded to cinchona febrifuge, and in which the parasites observed resembled in their young stages STEPHENS' *P. tenue*, and in their sexual stage were crescents having much less pigment than those of *P. falciparum*, and a nucleus larger and rounder and also finely vacuolated.

A. A.

ROUBAUD (E.). **Méthodes rapides pour les examens de sang paludéen en goutte épaisse.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 702–703.

For the rapid detection of malaria parasites the author dries a thick film very quickly by heat (45°–50° C.) and then haemolyses it in distilled water (5–10 minutes). This procedure destroys the parasites, but leaves their distinctive yellow-brown pigment, which can be shown up more clearly if the film be stained for a few seconds with thionine or carbol violet. In benign tertian the irregular streaks of small pigment-granules of the schizonts can be distinguished with ease from the blocks of pigment of the female gametes and the dense platelets of the male gametes; but the forms of the other species of parasites are not so easily discerned. In any case young forms still deficient in pigment cannot be detected.

For the rapid detection of crescents the author places the dried thick film in a solution of thionine in distilled water, of the strength of 1 in 10,000, for 10 to 15 minutes. This haemolyses the film and stains the crescents simultaneously.

A. A.

TAYLOR (H. A.). **A Comparative Study of Thick and Thin Blood Smears for Diagnosis of Malarial Fevers.**—*Jl. Amer. Med. Assoc.* 1917. Mar. 10. Vol. 68. No. 10. pp. 771–772.

In the course of a survey in N. Carolina two smears—one thick, one thin—were made from each of 3,613 apparently healthy persons. In 526 thicks parasites were demonstrated in examinations of five minutes' duration; but in the corresponding 526 thins the demonstrations were confirmed in only 125 cases, after examinations lasting 30 minutes. The greater accuracy and the saving in time of the thick film method is thus held to be confirmed.

In the routine of the Laboratory of Malarial Investigations the smears are now haemolysed, the slides being placed in acid alcohol until the haemoglobin is dissolved out; but some experience is said to be then necessary in differentiating the specific forms as they do not retain all their normal specific characters after this treatment.

A. A

SENEVET (G.). **Note sur un procédé de coloration de l'hématozoaire du paludisme.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 540–542.

Where special stains are difficult to procure an improvised eosin-azure stain is recommended by the author.

Two solutions are made: one, of methylene blue 1 gm., sodium borate 3 gm., distilled water 100 gm., which solution is left to ripen for 8 to 15 days at a temperature of 37° C.; the other, of watery eosin 1 gm., distilled water 100 gm. The author prefers staining for 2 or 3 hours in a weak stain—1 drop of the eosin stain, and 1 or 2 drops of the blue stain to 20 cc. of neutral distilled water.

A. A.

LEPRINCE (J. A.) & GRIFFITTS (T. H. D.). **Notes from a Malaria Survey: Impounded Waters, Biting of *A. punctipennis* on Porches, Distance of Flight of *A. quadrimaculatus*.**—*Southern Med. Jl.* 1917. Aug. Vol. 10. No. 8. pp. 642–644.

Anopheles punctipennis is comparatively seldom found inside houses and has very rarely been observed replete with blood in bedrooms, but it is often found beneath houses and frequently bites people sitting out in the porch in the evening.

Specimens of *A. quadrimaculatus* lightly sprayed with watery eosin were recovered in one instance 5,565 feet from the point of liberation, in one instance 2,800 feet, in two instances 3,245 feet, and in three instances 3,090 feet.

A. A.

LÉGER (L.) & MOURIQUAND (G.). **Sur l'hibernation des Anophèles en Dauphiné.**—*Bull. Acad. Méd.* 1917. Oct. 2. 3 Ser. Vol. 78. Year 81. No. 38. pp. 357–359.

These observers note that in Dauphiny [as is also the case in England] the larva of *Anopheles bifurcatus* lives through the winter, and may complete its transformations into the adult stage about the end of April at the earliest. Their earliest observation of young larvae of *A. maculipennis* (which passes the winter in the adult stage) was in the month of May. In a pool at Monestier de Briancon, at an elevation of 1,500 metres, larvae of both species were found together on the 20th July.

A. A.

VAN BREEMEN (M. L.). **Een voorloopig onderzoek betreffende de verschillende soorten van Anophelinen, te Soerabaia voorkomende.** [A Preliminary Research on the Species of Anopheles occurring at Sourabaya.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 3. pp. 325–329.

The author finds that the species of Anopheles occurring at Sourabaya [Java] are four in number, namely, *A. barbirostris*, *A. sinensis*, *A. rossii* Giles and *A. rossii* var. *indefinitus*. A few larvae of *A. kochii* were also found at the beginning of the year By far the most common species was *A. rossii* Giles, which is not generally regarded as a malaria-transmissor. Specimens sent home to the British Museum by Dr. STANTON for identification were pronounced there to be *Myzomyia rossii* Giles (type form). There is plenty of malaria in the district. A further communication on the subject is promised.

J. B. N.

BASS (C. C.). **Some Important Facts about Malaria.**—*Kentucky Med. Jl.* 1917. Aug. 1. Vol. 15. No. 8. pp. 393–396. With 2 figs.

A first-class compendium of the cardinal facts—"what should be generally known about malaria, both by the medical profession and by all others."

A. A.

CHRISTY (Cuthbert). **Notes on Malaria for Officers and Men.**—*Lancet.* 1917. Sept. 29. pp. 485–486.

The author as Adviser for Malaria and Tropical Sanitation to the East African Expeditionary Force has codified the essential facts regarding the natural history of malaria and mosquitoes and their inter-relation, and also the essential measures of prophylaxis and treatment of malaria, within necessitated limitations.

A. A.

WURTZ. **De la conduite à tenir vis-à-vis des paludéens.**—*Presse Med.* 1917. July 26. Vol. 25. No. 42. pp. 435–436.

This is one of the numerous admonitory articles upon the prospective danger of a general recrudescence of malaria in France as one of the consequences of the expeditionary movements of the war.

A. A.

CARVER (A. E.). **Quinine Therapy and Hydrotherapy in the Treatment of Malaria.** [Correspondence.]—*Lancet.* 1917. Oct. 20. pp. 623–624.

The writer attests the value of quinine in malaria, recognizes that it is disgusting in the mouth, realizes the possibility that excessive doses may lower the natural defensive powers, and speaks favourably of intramuscular injections in severe cases. In cases that are not severe, as well as in cases that resist quinine, the writer in rather a lukewarm argument suggests baths.

A. A.

D'ANFREVILLE (L.). **La lutte antipaludéenne à Salé, Maroc.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 710–715. With 1 map.

The interest of this paper is mainly local; but the moral of it appears to be the obvious one that local anti-malarial policy must be adapted to the settled indispensable customs of the locality.

A. A.

DELANOË (P.). **Sur les altérations des globules parasités par les hématozoaires du paludisme.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 542–547.

The author finds that for studying the alterations in the infected red blood cells the method of PAPPENHEIM is superior to that of GIEMSA.

A. A.

Werner (H.). **Ueber Zählungsmethoden von Malariaparasiten. Bemerkung zu der Arbeit von Ballin in Nr. 28.**—*Deut. Med. Woch.* 1917. Oct. 11. Vol. 43. No. 41. p. 1299.

Refers to his previous publications (1912) on enumerative methods, from which extracts are given.

A. G. B.

Jarno (Leo). **Ueber Mononukleose bei Malaria.**—*Wien Klin. Woch.* 1917. July 19. Vol. 30. No. 29. pp. 914–915.

This paper deals with the phenomenon of "mononucleosis" in malaria cases both recent and chronic. The author has tried Brauer's subcutaneous injection of horse serum to bring out a latent malaria in 37 cases without success [see this *Bulletin*, Vol. 10, p. 155].

A. G. B.

Paris (P.). **Quelques mots sur les Moustiques et le Paludisme en France.**—*Jl. de Méd. et de Chirurg. Pratiques.* 1917. May 25. Vol. 88. No. 10. pp. 401–404.

An essay, by no means of an exhaustive kind, on mosquitoes and malaria, with some particular reference to the distribution of Anopheles and of latent or potential malarious areas in France.

A. A.

BLACKWATER FEVER.

ARMAND-DELILLE (P.), PAISSEAU (G) & LEMAIRE (H.). **Note sur les caractères de la bilieuse hémoglobinurique observée chez les paludéens de l'armée d'Orient.**—*Bull. et Mém. Soc. Méd. Hôpit de Paris.* 1917. June 28. 3 Ser. Vol. 33. No. 21–22. pp. 773–776.

In the French Army of the East bilious haemoglobinuria has been a frequent complication of malaria, and 30 per cent. of the cases coming under the authors' observation have been fatal. Besides typical cases, other atypical cases showing the transition from malarial jaundice have been noticed.

Two predisposing conditions were observed to be of signal importance, namely a prolonged malarial infection (generally more than 6 months) and cold weather (the depth of winter)—the latter condition not so uniformly constant. All the cases had a history of preventive quinine, and generally of quinine treatment.

The rest of the paper consists of a description of the usual urine and blood phenomena during the haemoglobinuric crisis. A detailed description of the clinical and pathological observations will be published hereafter.

A. Alcock.

DE RAADT (O. L. E.). **Die komplementogene Wirkung von Chinin im Zusammenhange mit dem Entstehen des Schwarzwasserfieberanfalles.**—[The Action of Quinine in increasing Complement in Relation to the Onset of an Attack of Blackwater.]—*Arch. f. Schiffs.-u. Trop.-Hyg.* 1917. May. Vol. 21. No. 9. pp. 149–153.

The author refers to a paper published by him in 1909 in which he formulated certain "theoretical" conclusions. These were to the effect that predisposition to blackwater fever is due to the appearance of haemolytic amboceptors in the blood of the person concerned, these being mobilised under the influence of the malarial infection and having both a haemolytic and parasiticidal action. The onset or not of blackwater depends on the complement content of the blood and if this is low there is a gradual blood dissolution but no onset. Chill, excessive effort, traumatism and quinine cause a sudden overproduction of complement; this action may be called "complementogenous." He has experimented on the action of quinine in this direction, with five healthy Javanese and fifteen with chronic malaria. Whereas in four of the former the haemolytic power of the serum was unaltered and in one it was raised, in eight of the latter it was increased, some fifty, some a hundred per cent. The practical conclusion is [if the premisses are granted] that such persons in blackwater fever regions are in greater danger than those in whom quinine has no such action, and that an effort should be made to detect them. There is a hint also for the treatment of blackwater, namely to give some substance which will reduce the quantity of complement. This may be brought about in animals by intravenous injection of hypertonic salt solution, but not, as far as three experiments showed, in man. The author notes in conclusion that Dutch observers have shown that in paroxysmal haemobloginuria complement vanishes from the blood. This perhaps explains the happy fact that in blackwater the haemolytic process as a rule soon comes of itself to an end.

A. G. B.

TORRANCE (R. A.) & BOWMAN (F. H.). **Report of Cases of Hemoglobinuria in Haiti.**—*U. S. Nav. Med. Bull.* 1917. Apr. Vol. 11. No. 2. pp. 141–150. With 5 charts.

The report includes 13 cases, with short abstracts of 8 of them. One case, of prolonged residence in Haiti and a history of former attacks, was fatal. The other cases recovered under treatment by intramuscular injections of quinine, absolute rest in bed, and large doses of weak solution (30 grains to the pint) of sodium bicarb. by mouth or, if necessary, by rectum. The quinine had to be given in this way as facilities for intravenous injection were wanting in the field.

A. A.

WRIGHT (Thomas E.). **Notes on the Treatment of Blackwater Fever.**—*New Orleans Med. & Surg. Jl.* 1917. Sept. Vol. 70. No. 3. pp. 222–225.

Regarding the retching and vomiting of blackwater fever as the most menacing symptoms of the disease, from the standpoint of practical treatment, and arguing from analogy that these symptoms are due to acid intoxication, the author concludes that the main line of treatment is to neutralize the assumed acidity with bicarbonate of soda [cf. BURKITT, this *Bulletin*, Vol. 7, p. 29]. This may be given in various ways as necessitated by circumstances—mouth, rectum, intravenous—in combination with glucose. Quinine can be employed, if necessary, after the vomiting, etc., are relieved.

In the course of discussion, enlivened by many humorous touches, one speaker stated that in his time turpentine had been extolled just as highly as bicarbonate of soda, and another speaker confessed that he was well satisfied with the treatment that he had learned from the mouth of an irregular (it is to be feared) practitioner: "Waal, Doctor, I has these cases of malayal hemectoria and I gives 'em calomel in teaspoonful doses, and I cure 'em."

A. A.

JOB (E.). **Note sur le traitement de la fièvre bilieuse hémoglobinurique.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Jan. 18. 3 Ser. Vol. 33. No. 1–2. pp. 89–96.

After a discriminative review of various theories the author concludes in favour of the ultimate malarial origin of haemoglobinuric fever, and while allowing that quinine like other drugs may be ancillary to a haemoglobinuric convulsion he repudiates entirely the view that quinine is a specific cause of this disease.

He gives a resumé of 15 cases treated with quinine and chloride of calcium, in 11 of which malaria parasites were found. The course of treatment extended to 15 days, and the dose of quinine was gradually increased from 1 cgm. on the first day to 1 gm. on the fourteenth and 15th days, the dose of calcium chloride being constantly 4 gm. The object of the calcium was to increase the globular resistance. The results of this treatment were extremely good, even in the cases where malarial parasites could not be detected.

A. A.

AMBLARD (L.-A.) & ESCHBACH (H.). **Bilieuse hémoglobinurique par laquage du sang.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. July 12. 3 Ser. Vol. 33. No. 23–24. pp. 814–818.

An account of an attack of haemoglobinuric fever in which a predominant phenomenon was observed to be a massive haemoglobinaemia.

A. A.

WIENER. **Einige Fälle von Schwarzwasserfieber.**—*Wien. Klin. Woch.* 1917. July 19. Vol. 30. No. 29. pp. 912–914. With 4 charts.

An account, with temperature charts, of four cases of blackwater which occurred in soldiers in South Albania. All were tertian; in one sub-tertian parasites were found also; all recovered.

A. G. B.

AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

WENYON (C. M.) & O'CONNOR (F. W.). **An Inquiry into some Problems affecting the Spread and Incidence of Intestinal Protozoal Infections of British Troops and Natives in Egypt, with Special Reference to the Carrier Question, Diagnosis, and Treatment of Amoebic Dysentery, and an Account of Three New Human Intestinal Protozoa. [Conducted under the Auspices of the Medical Advisory Committee M.E.F. (January to August, 1916.)]** *Jl. Roy. Army Med. Corps.* 1917. Apr., May, June, Vol. 28. Nos. 4, 5, 6. pp. 461–492, 557–565, 686–698.

The first part deals with the treatment of *E. histolytica* and other protozoal infections of the human intestine. Treatment of *E. histolytica* cases by means of emetine hydrochloride administered by three methods is first described. The results obtained in carrier and acute cases are tabulated as follows. The treatment in each group consisted of a course extending over twelve days.

	Emetine one grain a day injection.	Emetine one grain a day by the mouth	Emetine one grain a day injection; ½ grain a day by the mouth.
Carrier cases cured ..	37	6	30
„ „ relapsed ..	10	2	0
„ „ no reaction ..	5	1	0
Acute cases cured	0	0	2
„ „ relapsed ..	6	2	5
„ „ no reaction ..	0	1	0

Attention is drawn to the fact that failure to cure by emetine by one mode of administration did not exclude the possibility of cure by another and also the successful results obtained in carriers are contrasted with the lack of success in the acute cases. The combined method of injection plus oral administration gave the best results. The authors discuss the existence of emetin resistant strains of amoebae, and the effect of emetin as producing encystment. Sections on the influence of other infections, diet, and rest in bed on treatment and the effects of emetin on the patient follow. Relapses after treatment were found to occur under twenty days except in three cases.

The second part deals with the treatment of *E. coli* infections and infections with Lamblia, Tetramitus, Trichomonas, Coccidia, I-cysts and Blastocystis. Emetin by the mouth or bismuth salicylate produced temporary disappearance of flagellates but relapse occurred after short courses. An account is given in the third part of experimental work with flies and laboratory animals, and also of experiments made to determine the power of resistance of protozoal cysts to disinfectant and other agents.

A summary of the results of this work is given :—

"1. Attempts were made to infect rats, mice and kittens with *E. histolytica,* both in faeces and liver abscess pus. Two kittens alone became infected.

"2. *Tetramitus mesnili* free and encysted failed to infect a rat, a mouse and a kitten.

"3. A kitten and a mouse failed to become infected with the human coccidium (Isospora).

"4. Lizards (Agama sp. ?) harbour tetramitus and an amoeba. The latter resembles *E. coli,* both in the free condition and the production of an eight-nuclear cyst.

"5. House-flies readily take up free and encysted forms of protozoa in faeces and can pass them from the gut as early as five minutes and as late as twenty hours after feeding.

"6. Wild flies captured in Alexandria often deposit in their droppings cysts of protozoa and eggs of worms which they have evidently taken up from human dejecta on which they have fed.

"7. A series of weighing experiments show that a single house-fly will take up one milligram of faeces in half an hour.

"8. Cysts of *E. histolytica* will survive in water but are killed instantaneously by drying. The cysts are killed at once by 1 in 20 cresol solution."

B. Blacklock.

Woodcock (H. M.). Protozoological Experiences during the Summer and Autumn of 1916.—*Jl. Roy. Army Med. Corps.* 1917. Sept. Vol. 29. No. 3. pp. 290–300.

The first section of this paper includes tables showing the percentage incidence of *E. histolytica* and other protozoa, in 659 cases of dysentery and diarrhoea; of the cases 378 were British and 281 Indian.

Table II.—Occurrence of *E. histolytica.*

Nationality.	Total findings of *E. histolytica.*	Percentage of total cases.	Histolytica-form.	Percentage of total "dysenterics"	Percentage of blood and mucus stools.	Tetragena-form and (or) cysts.	Percentage of diarrhoeal stools.
British ..	7	1·9	7	2·4	4·0	—	—
Indian ..	44	15·7	13	12·4	26·5	31	17·6

Table III.—Other Protozoan Infections.

Nationality.	Number of cases.	*E. coli.*	Trichomonas.	Macrostoma.	Lamblia.	Balantidium.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
British ..	378	6= 1·6	3= 0·8	2= 0·5	7=1·8	—
Indian ..	281	80=28·5	122=13·4	33=11·7	10=3·5	2=0·7

The author in discussing the possibility of establishing a diagnosis from the characters of the stool sample alone states that the presence or absence of amoebae in a dysenteric stool is the only safe guide. "Many cases," he states, "to all appearances similar, both macroscopically and as regards the nature of the cell exudate, have been met with coming under the category either of amoebic or bacillary dysentery."

Observations were made on Indians, 134 in number, who were normal as far as concerns their bowel condition. They were either in camp or in hospital for surgical treatment, malaria, etc. In 20 per cent. of these cases *E. histolytica* cysts were present. In view of this apparently natural infection in Indians the author concludes that "it is probable that on this account Indian troops were largely responsible for the outbreak of amoebic dysentery among the troops in Egypt and on the Peninsula in 1915." [Compare observation of YORKE and Collaborators, this *Bulletin*, Vol. 10, p 128.] Further sections give the results obtained by emetine treatment, remarks on amoebae, flagellate infections and general considerations in infection with intestinal protozoa.

B. B.

AUBERT (P.). **Amibiase à l'Armée d'Orient.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 611–629.

In this paper the author gives an account of an investigation into the prevalence of infection with dysentery amoebae and cysts. The patients were in hospital at Marseilles, Aix or Toulon, and had come from the East. They were 212 in number and taken from one or other of the three following groups :—

A. Patients who had had when in the East gastro-intestinal symptoms.

B. Patients who presented at the time of examination symptoms of dysentery or diarrhoea.

C. Patients presenting fever of long duration not capable of being referred to malaria, or any other cause.

The results of the examination of the stools are given and it is observed that pathogenic amoebae or cysts were present in 24·5 per cent. of the 212 cases.

The incidence of the infection was found to be for the localities Marseilles–Aix 34 per cent. of 132 cases, and Toulon 8·7 per cent. of 80 cases. The great difference appeared to require some explanation and the author suggests that it is to be found in the fact that at Toulon were received known cases of dysentery, cases which had been recognised and were severe. In consequence they had been more thoroughly treated, whereas the mild cases, many of which were unrecognized or insufficiently treated were in the Marseilles–Aix group. The author emphasizes the necessity of investigating amoebic infection even in cases which have had no clinical dysentery.

B. B.

Carter (Henry F.), Mackinnon (Doris L.), Matthews (J. R.) & Smith (A. Malins). Part V with Stephens (J. W. W.). **Protozoological Investigation of Cases of Dysentery conducted at the Liverpool School of Tropical Medicine. (Second Report).**—*Ann. Trop. Med. & Parasit.* 1917. June 30. Vol. 11. No. 1. pp. 27–68.

Part I of this Report gives the protozoal findings in 826 cases of dysentery examined from Oct. 1 to Dec. 31, 1916. The Summary of this part is as follows :—

"1. From October 1st to December 31st, 3,930 protozoological examinations were made on the stools of 826 cases of dysentery.

"2. Of these, 420, or 50·8 per cent, were infected with protozoa.

"3. *E. histolytica* was found in 94 cases (11·4 per cent.), *E. coli* in 274 cases (33·2 per cent.), *G. intestinalis* in 151 cases (18·3 per cent.), *C. mesnili* in 36 cases (4·4 per cent.), and *T. intestinalis* in 7 cases (0·8 per cent.).

"4. The standard of non-infection for the majority (591) of the cases was three negative examinations."

Part II is occupied by a comparison of the authors' findings up to date with those of above observers. For this purpose they have availed themselves of the information contained in Dobell's report to the Medical Research Committee [see this *Bulletin*, Vol. 9, p. 404]. The protozoa are dealt with in turn and full details of the incidence of the infections are given.

In Part III the results are considered from the statistical standpoint.

Part IV contains important records of cases of infection with *E. histolytica* from the French front. Twenty cases are reported which have been observed by the authors in the last six months. The history of each case is briefly noted.

Part V contains records of treatment of *E. histolytica* infections with Alcresta ipecac., methyl emetine, and emetine bismuth iodide. Comparing the results obtained by a first treatment—not less than 10 gr. emetine—with Alcresta and the double iodide, the former gave 35·8 per cent of 81 cases relapsed, the latter 6·2 per cent. of 16 cases relapsed.

It is noted that 3 cases which resisted treatment by Alcresta and methyl emetine proved also resistant to emetine bismuth iodide. One of these cases had three successive courses of 15, 36 and 60 grains Biniodide and of these courses the 60 grain course produced the least effect, cysts being passed throughout treatment.

B. B.

Carter (Henry F.) & Matthews (J. R.). **The Value of concentrating the Cysts of Protozoal Parasites in examining the Stools of Dysenteric Patients for Pathogenic Entamoebae.**—*Ann. Trop. Med. & Parasit.* 1917. Aug. 23. Vol. 11. No. 2. pp. 195–204.

The authors have examined 178 cases upon which they utilized the method of concentration described by Cropper and Row [this *Bulletin*, Vol. 9, p. 421]. The number of examinations by the concentration method was 523. No infection with *E. histolytica* had been discovered in 133 of these cases by 3 routine examinations carried out in the ordinary way. By using Cropper and Row's method *E. histolytica* infection was demonstrated in 5 of these cases; one concentration examination was made in each case on the same material upon which the third ordinary routine examination had been made.

In 35 cases in which *E. histolytica* had been present and where the patients after treatment with emetine bismuth iodide or alcresta ipecac had been examined daily with negative result, a single examination made on the 24th day by the concentration method proved also negative.

B. B.

SMITH (A. Malins) & MATTHEWS (J. R.). **Further Records of the Occurrence of Intestinal Protozoa in Non-Dysenteric Cases.**—*Ann. Trop. Med. & Parasit.* 1917. Aug. 23. Vol. 11. No. 2. pp. 183–193.

The authors' previous paper on this subject [this *Bulletin*, Vol. 9, p. 445] dealt with 250 patients; the present records the results obtained in the examination of 200 additional cases. Of these 34·5 per cent. had protozoal infection of the intestinal tract, 7·5 per cent. having *E. histolytica* infection. The results are reproduced from the authors' table below:—

The infections found in the 200 *cases examined.*

	Number of cases infected.	Percentage of all cases.	Pure infections.	Mixed infections.	Our previous results from 250 cases.
Entamoeba histolytica	15	7·5	4	11	8·0%
Entamoeba coli ..	47	23·5	32	15	19·2%
Giardia (=*Lamblia*) *intestinalis* ..	23	11·5	13	10	8·0%
Chilomastix (=*Tetramitus*) *mesnili* ..	4	2·0	3	1	2·0%
Trichomonas intestinalis	—	—	—	—	1·7%

An analysis of the figures is made with details as to the number of examinations, and occurrence of double and multiple infection. A section is devoted to a consideration of the relationship between the protozoal findings and the disease for which the patients were admitted to hospital. Among 100 malaria cases for example 6 cases of infection with *E. histolytica* were found. Again the cases are grouped and tabulated with reference to a history of previous dysentery. Of 42 cases with a history of dysentery 7·1 per cent. had *E. histolytica* infection. The authors state:—"It seems probable that there is little difference between the percentage of *E. histolytica* carriers among men who have had dysentery and the percentage of men who become carriers without suffering from dysentery at all." WENYON'S results are quoted for comparison, and finally the cases are classified according to the region in which they had travelled. Of 142 patients who had been to tropical or subtropical regions 7·7 per cent. had *E. histolytica* while this parasite was present in 6·9 per cent. (58 cases) who had been to France only.

B. B.

FUCHS (A.) & BOUCHET (Henri). **Une petite épidémie d'amibiase sur le front.**—*Presse Méd.* 1917. Aug. 6. Vol. 25. No. 44. p. 455.

A small epidemic of amoebic dysentery occurred in a section of an infantry regiment occupying part of the first line. Four cases of liver abscess occurred and in two of these amoebae were found in the pus evacuated. The author notes the absence of dysenteric symptoms in these cases. He considers that a soldier who had been in Beyrouth and was a cyst carrier was the source of the infection. B. B.

DARGEIN. **Un cas autochtone d'hépatite suppurée d'origine amibienne.** —*Arch. Méd. et Pharm. Nav.* 1917. Feb. Vol. 103. No. 2. pp. 125–131.

The possibility of carriers of amoebic dysentery giving rise to epidemics is mentioned by the author àpropos of a case of liver abscess occurring in 1910 in a man born at Toulon who had never left that town. The history of the case is dealt with very fully; amoebae were found in the liver pus. B. B.

MATTEI (Ch.). **Syndromes cholériformes et insuffisance rénale dans la dysenterie amibienne chez les soldats en campagne.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Feb. 22. 3 Ser. Vol. 33. No. 5–6. pp. 366–377. With 1 chart.

In a series of 250 cases of amoebic dysentery the author met with 6 cases, all autochthonous, in which the following symptoms occurred: uncontrollable diarrhoea with pale watery odourless stools, vomiting, cramp, profound asthenia, rapid compressible pulse, and algidity. Three of the cases presented such symptoms at the clinical onset of their dysentery, the other three either during the course of or during convalescence from dysentery. Observations on the amount of urea contained in the vomited matter, urine, the faeces, and the blood were made and the results are presented graphically. The author concludes that most frequently such crises occur in those whose kidneys are affected by previous conditions, and who are subjected to over exertion. The treatment adopted therefore should be directed primarily towards the restoration as rapidly as possible of the renal functions. B. B.

ARMAND-DELILLE (P.), PAISSEAU (G.) & LEMAIRE (H.). **Sur le traitement des abcès du foie par l'émétine.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. June 28. 3 Ser. Vol. 33. No. 21–22. pp. 777–778.

This paper contains a general account of the authors' views on liver abscess. They consider that not only in the stage of hepatitis but also after abscess of considerable size has developed, treatment by emetine may effect a cure. They cite one case where resorption occurred when pus had been proved to be present by puncture; they attribute the successful result to emetine treatment. B. B.

AIMÉ (Henri). **Traitement combiné de la dysenterie amibienne.**—*Progrès Méd.* 1917. July 28. No. 30. pp. 253–255.

The author gives an account of 20 cases of amoebic dysentery treated by injections of emetine combined with administration of atoxyl.

The latter was given in cachets with lactose, the doses employed being 4 and 5 centigrammes, daily for short periods. The results were good, only 27 per cent. of cases proving refractory. The period of observation was too short to give satisfactory evidence of final cure.

B. B.

SAVAGE (R. E.) & YOUNG (J. R.). **Report on the Treatment of Fifty-Nine Cases of *Entamoeba histolytica* Infection. With Clinical Remarks.**—*Jl. Roy. Army Med. Corps.* 1917. Sept. Vol. 29. No. 3. pp. 249–275. With 12 diagrams.

The authors define their terms as follows:—"Cyst carriers," (a) cases which had had acute amoebic dysentery and been incompletely cured and were passing the encysted form of *E. histolytica* in their stools: (b) those who were passing cysts but had never had any clinical symptoms of amoebic dysentery. An "acute" case is so called if the large entamoebae, with included red blood corpuscles, are found. A case is described as cured if the stools have been free from infection for about three weeks after the conclusion of the emetine treatment.

Section I deals with Hypodermic injections of Emetine hydrochloride: Section II with Hypodermic injections of Emetine hydrochloride and Pulv. ipecac by the mouth; Section III, Emetine hypodermically and orally; IV, Emetine bismuth iodide; V, Emetine hypodermically and Emetine bismuth iodide. The authors' Table I summarizing the results obtained is reproduced below.

TABLE I.

Summary of the Results of the Treatment of Fifty-nine Cases of *Entamoeba histolytica* Infection.

		Cured.	Re-lapsed.	No re-action.	Total.
I. Emetine injections ..	Carriers	8	5	3	16
	Acute	1	2	—	3
II. Emetine injections and pulv. ipecacuanha ..	Carriers	5	1	—	6
	Acute	1	—	—	1
III. Emetine injections and orally	Carriers	3	—	—	3
	Acute	1	—	—	1
IVA. Emetine bismuth iodide	Carriers	14	1	2	17
	Acute	8	6	2	16
IVB. Emetine bismuth iodide (second course)	Carriers	—	1	—	1
	Acute	1*	1	—	2
V. Emetine injections and emetine bismuth iodide	Carriers	1	1	—	2
	Acute	2	6	—	8

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* Since writing this report, Case 53, reported as cured by a second course of emetine bismuth iodide, has been readmitted to hospital with a relapse.

The remainder of the paper gives detailed accounts of the various groups.

Under Clinical remarks the effects of the administration of emetine bismuth iodide are discussed; the dosage was 30–36 grains.

WADDELL (W.), BANKS (C.), WATSON (H.) & KING (W. O. Redman). **A Report on the Treatment of 102 Carriers of Amoebic Dysentery with Emetine Bismuth Iodide.**—*Lancet.* 1917. July 21. pp. 73–77.

The form of the drug used was the keratin coated tabloid, each tabloid containing 1 grain of bismuth emetine iodide. The hour found most suitable for the administration of the daily dose—3 grains—was 1 p.m. after the midday meal. The effects were, in almost all cases, vomiting and purging, the former commencing an hour, the latter about 3 hours after taking the dose. The worst cases vomited 5 or 6 times during the 24 hours and some cases had 10–12 motions in this period. Stomach and bowel sedatives proved of little value, with the exception of tinct. opii which was seldom employed. A few of the patients were kept entirely in bed.

A note of caution is given about the necessity for obtaining definite evidence that the stool produced for examination is in fact that of the case under consideration. Elaborate precautions require to be taken to avoid substitution. The conclusions arrived at as the result of the authors' observations are:—

"1. Emetine bismuth iodide is much more effective than emetine hydrochloride in the treatment of carriers of *Entamoeba histolytica*, but about 20 to 25 per cent. of failures may occur.

"2. The intensely irritating properties of the drug in many cases are a drawback in its general application. [The authors note that salol-coated pills have now been introduced.]

"3. The definite failure to cure 19 out of the 102 cases treated at Barton may perhaps be in part due to the form of the drug employed (a keratin-coated tabloid).

"4. It is improbable that there were many relapses later than those discovered; and as several of the cases had only 8 or 9 doses instead of 12, it seems likely that less than 36 grains may be effective.

"5. It is advisable to keep cases under observation for not less than 14 days after treatment, and to examine them not less than 4 times during that period if relapses are to be detected.

"6. The drug is without appreciable effect upon the intestinal flagellates, but has an effect, usually temporary, on *Entamoeba coli.*"

B. B.

LILLIE (D. G.) & SHEPHEARD (S.). **A Report on the Treatment of *Entamoeba histolytica* "Carriers" with Emetine Bismuth Iodide. Giving a Comparison between the Keratin-Coated Tabloids and Salol-Coated Pills.**—*Lancet.* 1917. Sept. 15. pp. 418–419.

One hundred and four cases were treated in all. The treatment consisted of 3 grs. per day for 12 consecutive days. The tabloids or pills were given entire as a full dose during breakfast. A case was considered cured when he had had at least six negative tests over a period of not less than seven weeks from the termination of treatment. The authors give an account of investigations which they made into the effect of the time interval between the onset of disease and treatment, and into the occurrence of vomiting, loss of weight, and the effects of age on curative results, and on vomiting. The conclusions are:—

"1. (a) That 'carriers' of *E. histolytica* who had not had any injections of emetine hydrochloride were cured to the extent of 78 per cent. by two courses of the salol-coated emetine bismuth iodide pills. (b) In the case of men who had had emetine injections 72·8 per cent. were cured by two courses of the salol-coated pills. (c) In the case of men who had not had emetine injections 70 per cent. were cured by two courses of the keratin-coated tabloids. (d) In the case of men who had had emetine injections 45·4 per cent. were cured by two courses of the keratin-coated tabloids.

"The difference between the percentages in (a) and (b) are within the range of experimental error and need not be considered. But in (c) and (d) the difference is too great to be ignored. This difference may be due to variation in the quality of the keratin-coated tabloids, but such a defect would be common to both cases which had received injections of emetine and those which had not. It is generally admitted that certain 'carriers' of *E. histolytica* are not cured by emetine in any form, and it may be, as Mr. Dobell suggests, that these cases become segregated in (d). It seems possible that the difference in the two percentages may be due to the injections of emetine rendering the 'carriers' less liable to be cured by E.B.I.

"For comparison with the above percentages of cures by a maximum of 72 grains of E.B.I. carried out in the special ward, we give the number and percentage of cures in the other wards of this hospital. The number of grains of E.B.I. which these cases received varied from 36 to 200. A case was regarded as cured after not less than 5 negative examinations over a period of not less than 5 weeks after the end of treatment. The last test was made at the Barton Convalescent Depot. Out of 160 cases treated 142 were cured—i.e., 88·7 per cent.

"2. There is no evidence that the length of time between the dates of onset of dysentery symptoms and the treatment has any effect upon the chances of cure by E.B.I.

"3. There is no ground for the belief that the vomiting diminishes the chance of cure by the E.B.I. treatment. There is nearly as much vomiting among the cases which are cured as among those which relapse.

"4. The age of the patient has no effect upon the chance of cure by the drug. But there is evidence to show that men over 40 years of age vomit less while undergoing treatment.

"5. The salol-coated pills are a distinct improvement upon the keratin-coated tabloids from a curative point of view. They also cause less vomiting and loss of weight."

B. B.

WALKER (Ernest Linwood) & EMRICH (William). **The Treatment of Carriers of *Endamoeba histolytica* with Oil of Chenopodium.**—*Jl. Amer. Med. Assoc.* 1917. May 19. Vol. 68. No. 20. pp. 1456–1457.

Oil of chenopodium in doses of 16 minims was used in the treatment of 14 adult male carriers of *Endamoeba histolytica* at Porto Velho, Brazil. Ten out of the fourteen were apparently cured and four uncured. Of the ten cured, six were given a single treatment only, one had a second treatment after a day's interval, and three had three treatments. The treatment laid down by the authors for adults is

(1) Magnesium sulphate from ½ to 1 ounce at 6 a.m.; (2) Oil of Chenopodium 16 minims in gelatine capsules at 8 a.m., 10 a.m., and 12 noon; (3) Castor oil 1 ounce containing Chloroform 50 minims, at 2 p.m. Emphasis is laid upon the necessity for preliminary purgation with magnesium sulphate.

B. B.

UNNA (P. G.) & TIELEMANN (Eleonore Th.). **Zur Chemie der Amöben.** *Cent. f. Bakt.* 1 Abt. Orig. 1917. Aug. 30. Vol. 80. No. 1-3. pp. 66-89. With 1 coloured plate.

The authors have made a study of the effects of various reagents upon *Amoeba limax* from hay infusions. The methods are detailed. The reagents chiefly employed were (1) distilled water at 100° C.; (2) 2 per cent. sodium chloride solution at 100° C.; (3) saturated solution of Ammonium sulphate at 100° C.; (4) absolute alcohol at 55° C.; (5) ether at 35° C.; (6) acetone at 56·3° C.; (7) equal parts of absolute alcohol and benzin.

Films prepared on slides were fixed in osmic acid vapour and then dried in air, and treated with one of the reagents for the following periods: two minutes treatment with nos. 1, 2 or 3, fifteen minutes with nos. 4, 5 or 6, twelve hours in the case of no. 7. Then wash in water and stain examples with haematein, polychrome methylene blue, and Giemsa's solution. A table is given showing the findings obtained by a comparison of the results of exposure to the various reagents followed by various stains. The presence of at least six different albuminous substances can thus be demonstrated. The authors draw comparisons between the substances which can be demonstrated in metazoan cells and those which they found in *Amoeba limax.*

B. B.

HABERFELD (Walther). **Contribuição ao estudo dos kystos e da vitalidade das amoebas pathogenicas.**—*Ann. Paulist. Med. e Cirurg.* 1917. June. Vol. 8. Year 5. No. 6. pp. 125-129. With 15 figs.

This paper deals with the diagnosis of pathogenic amoebae by means of their cysts. The last portion is devoted to the consideration of the vitality of amoebae at different temperatures. The fact that amoebae die more rapidly when kept at 37° C. than at room temperature or lower the author explains by the chemical decomposition of the faeces and autolysis of tissue cells contained in it which proceed more rapidly at the higher temperature. Toxic products are released which react to the detriment of amoebae.

B. B.

TAIWAN IGAKUKAI ZASSHI. (*Journal of the Formosa Medical Society*).—**[Amoeba Cysts, an Easy Method of Staining.]** 1917. Apr. 28. No. 174. pp. 249-255. [From Review by R. G. MILLS.]

Various aniline dyes were tried and then, more fully, methylene blue and Congo red which were a little better than the rest. The living cysts were not noticeably affected, but those killed by heat or alcohol took the stains more readily. Iodine, however, in saturated solution in 70–80 per cent. alcohol was found to be the best.

The method advised was to secure the cysts from the faeces by filtering through gauze, centrifuging and spreading the sediment upon a slide with a slight excess of the iodine solution. These were thoroughly mixed and a cover glass dropped on. The field of vision becomes yellowish or light green and the cysts will be golden yellow with slightly darker nuclei. Starch granules are stained purplish and other matters which would be liable to cause confusion are lacking in good detail. The eggs of the various parasites are rendered quite plain by this method.

B. B.

MATHIS (C.) & MERCIER (L.). **Le soi-disant *chromidium* des kystes des entamibes intestinales de l'homme.**—*Bull. Soc. Path. Exot.* 1917. July Vol. 10. No. 7. pp. 536–538.

The term chromidium should not be applied to the siderophile bodies which exist in amoebic cysts, and which the authors consider are not derivatives of the nucleus but formed entirely by the cytoplasm. The siderophile rods in cysts of *E. dysenteriae* are different from the siderophile masses in cysts of *E. coli*, in mode of formation, geometric form, and compactness of structure. The presence of siderophile rods in *E. dysenteriae* cysts and their absence in *E. coli* cysts is a diagnostic point just as the size of the cysts and the number of their nuclei.

B. B.

DA CUNHA (A. Marques) & DA FONSECA (O.). **Sobre uma nova entaméba. *Entameba serpentis*, n. sp.**—*Brazil Medico.* 1917. Aug. 18. Vol. 31. No. 33. p. 279.

This is a short preliminary note on an entamoeba found in *Drymobius bifossatus*. Two forms large and small are described between which intermediate forms exist. The authors call the parasite *E. serpentis.*

B. B.

GOODEY (T.) & WELLINGS (A. W.). **Observations on *Entamoeba gingivalis*, from the Human Mouth, with a Note on the Trichomonad Flagellate *Tetratrichomonas buccalis*, n. sp.**—*Parasitology.* 1917. July. Vol. 9. No. 4. pp. 537–559. With 3 plates.

The authors set out to investigate the part played by *Entamoeba gingivalis* in causing pyorrhoea alveolaris. Their methods of examination, fixing and staining are described and the results obtained by them agree in the main with those of previous observers. The most important section of the paper is that in which is discussed the food of the parasite. Bacteria and larger bodies are found in the amoebae and as to the nature of these larger inclusions various authors differ. As a result of their investigations Goodey and Wellings conclude that these inclusions are almost entirely derived from salivary corpuscles. They conclude that the amoeba is not pathogenic, but on the contrary is a benign parasite and a useful scavenger. It may be found in healthy and in unhealthy mouths. Explanations as to why it is not found invariably are suggested.

The second part of the paper deals with the morphology of the trichomonas of the mouth, and the authors place it in the subgenus Tetratrichomonas with the name *Tetratrichomonas buccalis*, n. sp.

B. B.

NOWLIN (Nadine). ***Endamoeba buccalis.* I Its Multiplication and Periodicity.**—*Jl. Parasit.* 1917. June. Vol. 3 No. 4. pp. 143–149. With 1 fig.

By following one case for a long period (five months) the author obtained some evidence that the amoebae at certain periods become greatly reduced in number. This reduction is considered to be due to alteration in the saliva due to constitutional derangements. Encystment of the parasite was found frequently during these periods, and occurred chiefly in the periosteum. The author is commencing the study of tonsil sections in the hope of further elucidating the subject of tissue invasion by *Endamoeba buccalis.*

B B.

MARTY (L.). **Emétine et *Amoeba coli.* Observation.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 539–540.

A case from the Congo which presented in the faeces amoebae containing red corpuscles, amoebae not containing red cells, Lamblia, and spirochaetes, was treated by subcutaneous injections of emetine. The amoeba not containing red cells, *Lamblia intestinalis* and spirochaetes were not influenced by the injections. The amoebae containing red cells had disappeared.

B. B.

MATHIS (C.) & MERCIER (L.). **Existe-t-il des races d'*Entamoeba dysenteriae*?**—*C. R. Soc. Biol* 1917. Oct. 20. Vol. 80. No. 16. pp. 791–793.

The authors question the propriety of speaking of "strains" of *Entamoeba dysenteriae*; they consider the evidence of the existence of such strains doubtful and insufficient. They suggest certain lines of investigation to be followed before concluding that different strains exist

B. B.

MOREAU (Laurent). **Sur un cas d'amibiase hépatique autochtone. Abcès du lobe gauche. Intervention chirurgicale. Guérison.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 696–698.

A liver abscess developed in a soldier who had not left France. From the appearance of the pus and the symptoms the author concludes it was due to amoebic infection. Amoebae were not found in the pus. [No examination of the faeces is recorded.]

B. B.

DE MELLO (Froilano). **O sindroma febril nas amebiases hepaticas atenuadas.** [Fever in Mild Cases of Amoebic Affection of the Liver.]—*Bol. Ger. Med. e Farmacia.* Nova-Gôa. 1917. Apr. Vol. 4. No. 4. pp. 135–139.

Notes of a very ordinary case of amoebic abscess of the liver in which the temperature showed marked irregularities. The author points out that GRALL (*Bull. Soc. Path. Exot.*, 1917, Vol. 10, No. 1) has lately drawn attention to the same thing.

J. B. Nias.

RAZETTI (L.). **Tres nuevas aplicaciones del método de Rogers en el tratamiento de la amibiosis hepática.** [Three Cases of Liver Abscess treated on Rogers' Method.]—*Gac. Med. de Caracas.* 1917. June 15. Vol. 24. No. 11. p. 93.

Three cases of liver abscess treated by aspiration of the abscess cavity followed by injection of a solution of emetine in salt solution, with simultaneous administration of emetine subcutaneously.

The author is loud in his praise of this method for avoiding an open operation. [For previous cases see this *Bulletin.*]

J. B. N.

DE MELLO (Froilano). **Notas clinicas sobre um caso de amebiase entero-hepatica.** [Notes of a Case of Amoebic Dysentery.]—*Bol. Ger. Med. e Farmacia.* Nova-Gôa. 1917. Mar. Vol. 4. No. 3. pp. 102–105.

Notes of a case of dysentery which died in hospital after having been treated on and off in an irregular manner with emetine by different practitioners.

J. B. N.

MATTÉI (Charles) & BLOCH (Marcel). **Aspects des selles dans les formes atypiques de la dysenterie amibienne.**—*Presse Méd.* 1917. July 26. Vol. 25. No. 42. pp. 436–437.

This is a description of faeces in terms of food stuffs. The range of resemblance is considerable and extends from tapioca to scrambled eggs, from marine plants to vermicelli, from egg soup to brown caramel.

B. B.

HABERFELD (Walther). **Estudos sobre as difficuldades do diagnostico das amoebas pathogenicas enkystadas.**—*Ann. Paulist. Med. e Cirurg.* 1917. Feb. Vol. 8. Year 5. No. 2. pp. 35–38. With 1 fig.

The author complains that a colleague gave a diagnosis of "numerous pathogenic amoebic cysts" present after an examination of lightening rapidity, and that two other colleagues returned a diagnosis of amoebae and cysts in a case where, as a matter of fact, there was no amoebae nor cysts, but only numerous degenerating leucocytes.

B. B.

BACILLARY DYSENTERY.

LOYGUE (G.) & HAGUENAU (J.). **Sur une épidémie de dysenterie bacillaire observée dans la région de la Somme.**—*Presse Méd.* 1917. July 23. Vol. 25. No. 41. pp. 421–424. With 1 chart.

This paper deals with an epidemic of 449 cases of bacillary dysentery observed to the south of the Somme in a section of the front occupied by colonial troops from August 10th to November 10th 1916. Shiga's bacillus was isolated in 36 cases, Flexner in 5 and Hiss in 20. In a smaller number of cases three groups of organisms with the groups given in the following table were isolated:—

TABLE I.

	Motility.	Gram.	Bouillon.	Gelatine.	Agar.	Litmus milk.	Neutral red.	Indol.	Lactose.	Glucose.	Levulose.	Mannite.	Maltose.	Galactose.	Saccharose.	Lead.
Type I ..	0	—	Slight turbidity.	No liquefaction.	Colonies a little thicker than Flexner	Slightly reddened.	+	+	—	+	+	+	+	+	±	—
										Media not fragmented.						
Type II ..	0	—	do.	do.	do.	do.	+	+	—	+	+	+	+	+	—	—
										Media fragmented.						
Type III ..	+	—	do.	do	do.	do.	+	+	—	+		— + —	— + +		— + +	+

Agglutination was tested in 325 cases with 190 positive results of which 175 were positive to Shiga and 15 to Flexner. In 10 cases complement fixation was performed, with negative results in all cases. Mixed infections with the typhoid group were also observed, *B. paratyphosus* A being recovered from the stools 4 times and *B. paratyphosus* B twice, whilst agglutination was positive with Eberth's bacillus in 3 cases and with *para* A once. F. E. Taylor.

RATHERY (F.). **A propos du séro-diagnostic de la dysenterie.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Feb. 22. 3 Ser. Vol. 33. No. 5–6. pp. 315–317.

A note of a polemical nature but of some interest as the author asserts that he has done close on 20,000 agglutination tests with patients' sera against *B. dysenteriae* Flexner always using *the same strain* of bacillus, and has never found a titre of 1 : 100 except in cases which could be proved to be true bacillary dysentery. The author prefers the microscopic to the macroscopic test for agglutinations, especially in the case of *B. dysenteriae* Flexner. E. E. Atkin.

FUERST (Th.). **Die bakteriologische Kontrolle bei der Bekämpfung der Ruhr.** [The Bacteriological Control of the Campaign against Dysentery.]—*Münch. Med. Woch.* 1917. May 22. Vol. 64. No. 21. pp. 693–695.

The author states that the general opinion of the Army is that dysentery is a disease which can be diagnosed clinically without the aid of bacteriological investigations. This opinion is, he considers, detrimental to the prevention of the malady, since carriers play a great part in the spread of dysentery, and for the detection of carriers bacteriological investigations are absolutely essential. Fuerst gives the results of his two years' experience of the bacteriological investigation of dysenteric and suspected stools, and points out that more especially in the first year the material sent for investigation was seldom in a fresh condition.

Bacilli of the dysentery group (Flexner, Shiga or Y) were found in six per cent. of the cases in the summer of 1915 and in five per cent. in the summer of 1916. He considers that this low percentage of positive findings was due to the medical treatment which most of the patients had already received, especially the use of tannic acid preparations, which renders the isolation of the germs much more difficult. It was also noticed that the epidemics commenced with bacilli of the Flexner type, whilst later the Shiga-Kruse type predominated.

Complications, and especially arthritic complications, were usually due to the Shiga-Kruse type, as proved by the agglutination reactions given by the blood of such patients.

Finally the author calls attention, especially in convalescents, to strains of *B. coli* which show the so-called "para-agglutination," being agglutinated by dysentery serum in practically the same dilutions as the true dysentery bacilli. This para-agglutination can be distinguished from a group agglutination by the employment of CASTELLANI's method and by the fact that after repeated cultivation on artificial media the agglutinability disappears. F. E. T.

KIMMERLE. **Beobachtungen während einer Ruhrepidemie.** [Observations during an Epidemic of Dysentery.]—*Arch. f. Schiffs- u. Trop-Hyg.* 1917. June. Vol. 21. No. 11–12. pp. 188–199. With 1 chart.

In the summer of 1915 the author observed amongst German troops a small epidemic of dysentery due to the Y bacillus and in the autumn of 1916 a somewhat larger outbreak also due to the same bacillus, together with a single case of Shiga-Kruse dysentery. With regard to the spread of the disease, the water supply was beyond suspicion, and attention was called to the danger of "carriers," to infection from the civil population and to the occurrence of cases so slightly ill that they did not report sick and so come under the control of the physician. Of the 140 cases observed dysentery bacilli were obtained from cultures of the stools in 50, *i e.* 35·7 per cent. This small percentage was probably due to the difficulty of obtaining fresh material for examination since SELIGMAN, whose laboratory was situated much nearer to the front, found 70 per cent. positive. Agglutination was found in concentrations of 1 in 80 to 1 in 320. Treatment consisted of calomel, castor oil and Bolus alba. There were no deaths, only one recurrence, and only eleven patients remained longer than twenty days under treatment.

F. E. T.

BREINL (Friedrich). **Zur Frage der bakteriologischen Ruhrdiagnose.** [The Bacteriological Diagnosis of Dysentery.]—*Wien. Klin. Woch.* 1917. May 31. Vol. 30. No. 22. pp. 689–691.

The author found that dysentery bacilli could usually be found without difficulty in cases which were clinically recognisable as dysentery provided that the material for bacteriological examination was obtained by washing out the intestine and making cultures as soon as possible, preferably at the bedside. When the material for investigation has to be sent any distance it should be maintained at a low temperature, otherwise positive results are seldom obtained after twenty-four hours.

F. E. T.

JACOB (L.). **Klinische Beobachtungen bei Bazillenruhr.** [Clinical Observations on Bacillary Dysentery.]—*Zeitschr f. Hyg. u. Infektionskr.* 1917 May 3. Vol. 83. No. 3. pp. 467–488. With 15 charts.

The author, a privat-dozent of Würzburg, made his observations on a large number of cases of dysentery in two military hospitals. The diagnosis was established by bacteriological examination and 45 per cent. of positive results was obtained. Infection with the Shiga-Kruse bacillus gave rise to more severe conditions in a larger percentage of cases than did infection with the Flexner bacillus, although the pseudo-dysentery bacilli (Flexner) sometimes produced very severe and even fatal cases, whilst Shiga-Kruse bacilli sometimes produced quite mild cases. The clinical picture was very uniform, the slight and the severe cases being recognisable as such even in the early stages of the disease, as the condition of the temperature and pulse were characteristic for each group. Mixed infections and complications were seldom observed. The majority of the recommended medicaments which were administered did not appear to influence the intestinal symptoms, with the exception of atropine which often promptly relieved severe abdominal pains. Opium also exercised a beneficial effect on the pain and diarrhoea and should therefore not be withheld. An increase of toxicity and therewith a general deterioration of the general condition was not observed after the use of this drug. Calomel, even when given early, did not shorten or mitigate the course of the disease.

F. E. T.

NÈGRE (L.). **Recherches sur les bacilles pseudo-dysentériques au point de vue de leurs affinités avec les bacilles dysentériques et le *Bacterium coli*.**—*Ann. Inst. Pasteur.* 1917. Apr. Vol. 31. No. 4. pp. 172–186.

The pseudo-dysenteric group, according to the author, is one which comprises bacilli, both motile and non-motile, that resemble the dysentery bacilli of the Shiga and Flexner type, but differ from them in certain characters.

From a study of their cultural characters, agglutinating properties and complement fixing powers it is concluded that the pseudo-dysentery bacilli constitute a group which is intermediate between *B. coli* and the true dysentery bacilli.

F. E. T.

GIBSON (H. Graeme). **A New Method of Preparation of a Vaccine against Bacillary Dysentery which abolishes Severe Local Reaction. Also Experiments with this Vaccine on Animals and Man.**—*Jl. Roy. Army Med. Corps.* 1917. June. Vol. 28. No. 6. pp. 615–657. With 5 figs.

This is a rather long article and an elaborate analysis of it is not possible here. The main obstacle to the administration of Shiga dysentery vaccines is the intense local reaction which they cause. Several different kinds of vaccine were tried, such as an emulsion killed by eusol, an emulsion killed by carbolic acid and sensitised with anti-dysenteric serum, but the one that gave the best results was one that was treated, not with whole serum, but with anti-dysenteric serum which had previously been absorbed with Shiga bacilli. The only criterion brought forward of its usefulness in man was the production of antibodies—agglutinins, bactericidins and antitoxins—but as it promises well it is now undergoing an extensive trial in the battle-field.

Incidentally the relapse of a case of trench nephritis is recorded, with the admonition that this disease must therefore be taken as a contra-indication against inoculation.

E. E. A.

DITTHORN (Fritz) & LOEWENTHAL (Waldemar). **Ein neuer multivalenter Ruhrschutzimpfstoff.** [A New Multivalent Protective Injection for Dysentery.]—*Deut. Med. Woch.* 1917. Aug. 2. Vol. 43. No. 31. pp. 967–968.

Although they admit the excellence of sensitised vaccines in bacillary dysentery Ditthorn and Loewenthal claim to have prepared a dysenteric vaccine in which sensitisation is replaced by a method of physico-chemical treatment of the bacilli employed. The actual technique employed is withheld; the only information given is that the bacilli are previously killed with phenol, and they claim that the antigenic properties of the virus are in nowise deteriorated by the treatment.

Following the injection of the vaccine in man there is sometimes no reaction and sometimes pain and swelling at the seat of inoculation are complained of. The serum of injected persons may contain no agglutinins or may have an agglutination titre of 1 in 200 for dysentery bacilli. The authors attach little importance to the presence or absence of agglutinins, for they do not consider that the agglutinating powers serve to indicate the degree of immunity acquired. Three injections of the vaccine are given, namely ·5 cc. ·8 cc. and 1 cc. injected deeply into the subcutaneous tissues, thus avoiding much cutaneous reaction. In cases where the local reaction is excessive, the injection of a little anti-dysenteric serum is recommended.

F. E. T.

SCHULTZ (Werner). **Ueber eine neue Form von Dysenterieantigen.** [A New Form of Dysentery Antigen.]—*Deut. Med. Woch.* 1917. Aug. 2. Vol. 43. No. 31. pp. 968–970.

The anti-dysenteric vaccine of DITTHORN and LOEWENTHAL [see above] injected into man in doses of 1/64 to 1/11 of a loopful gives rise to general phenomena hardly appreciable. Some local reaction (redness, pain and infiltration) is always observed, but is easily supportable.

F. E. T.

MARGOLIS (Alexander). **Die Behandlung der Bazillenruhr mit Vakzine.** [Vaccine Treatment of Bacillary Dysentery.]—*Deut. Med. Woch.* 1917. June 21. Vol. 43. No. 25. pp. 783–785. With 5 charts & 1 diagram.

A dysentery epidemic occurred at Lodz in the summer of 1916. The cases were mostly of the Flexner-Y type. There were 33 severe cases, which were divided into 2 groups, one being treated with vaccine and the other only with astringents, bowel washes, etc., to serve as a control. The very worst cases were amongst those which received vaccine treatment. The effect on the mortality was decisive; 13 of the uninoculated died but only 8 of the inoculated. The duration of the disease was also curtailed. Four different kinds of vaccine were employed, namely, unsensitised killed, sensitised killed and living, and a killed autogenous, but no details are given as to their relations to the mortality figures given above.

E. E. A.

ROSS (Philip H.) & KAUNTZE (W. H.). **The Use of Polyvalent Vaccines in Dysentery.** [Correspondence.]—*Lancet.* 1917. June 23. pp. 965–966.

The vaccine used by the authors was made from organisms recovered from African natives suffering from dysentery in the Carrier Corps depot at Nairobi. It consists of *B. shiga*, 1 part; a motile bacillus with the sugar reactions of *B. shiga*, 1 part; a bacillus of the Flexner type, 1 part; three different strains of B. Morgan type, 3 parts. Carbolised cultures in peptone broth are mixed in the above proportions, tested for sterility after two days and issued as required. The results on administration to patients suffering from dysentery are stated to have been most promising, and complete statistics are promised at a later date.

F. E. T.

i. FORBÁT (Alexander). **Die spezifische Vakzinetherapie bei bazillärer Ruhr.** [The Specific Vaccine Therapy of Bacillary Dysentery.]—*Deut. Med. Woch.* 1917. July 26. Vol. 43. No. 30. p. 946.

ii. SKALSKI & STERLING. **Die spezifische Vakzinetherapie bei bazillärer Ruhr.** [The Specific Vaccine Therapy of Bacillary Dysentery.]—*Ibid.*

The views of Skalski and Sterling on the value of specific vaccine therapy in bacterial dysentery are to be found in this *Bulletin*, Vol. 10, p. 140. The above articles are devoted to a polemic on this subject in which no new facts are brought to light.

F. E. T.

FLAGELLATE DYSENTRY.

DE MELLO (Froilano). **Dous casos de flagelose intestinal.** [Two Cases of Intestinal Flagellosis.]—*Bol. Ger. Med. e Farmacia.* Nova-Gôa. 1917. Apr. Vol. 4. No. 4. pp. 139–143.

Notes of two cases of chronic diarrhoea, one in a native soldier and the other in a European sailor, in which examination of the stools did not reveal any other organism than flagellates to which the symptoms could be attributed.

Case I.—The patient had suffered for some time from a profuse diarrhoea without tenesmus or passage of blood. Microscopic examination of the stools showed no amoebae, and cultures for dysentery bacilli were negative. The microscope revealed, however, the presence of a very large number of flagellate organisms, from 50 to 85μ in length, symmetrical in shape and having a flagellum at each end of the body. A single nucleus, an axostyle and a vacuole situated near the anterior end of the body were present. Gradually the organisms lost their movements and became encysted, the flagella disappearing. In normal salt solution they remained alive for 3 or 4 days. Treatment of the diarrhoea with emetin and bismuth proved quite ineffective, but a partial success was obtained with CASTELLANI's prescription of methylene blue, of which 5 centigrammes was given by the mouth, and half a gramme in two clysters every day. The patient eventually left the hospital temporarily cured but, when seen 3 months afterwards, still complained of occasional attacks of diarrhoea. The author is inclined to classify the organism found in this case as a *Cercomonas*, but not as either *C. hominis* or *C. parva*, on account of its size.

Case II.—The patient had previously suffered from amoebic dysentery, which had been relieved with Dover's powder. The stools showed encysted amoebae and numerous flagellates, identified as

Trichomonas hominis. Treatment of the diarrhoea with methylene blue and bismuth had little effect and the patient was advised to return to Europe.

J. B. Nias.

Chace (Arthur F.) & Tasker (Arthur N.). **The Diagnosis and Treatment of the Flagellate Diarrheas.**—*Jl. Amer. Med. Assoc.* 1917. May 26. Vol. 68. No. 21. pp. 1528–1531. With 1 fig.

The authors recommend for flagellate diarrhoea a treatment consisting of oral administration of 2 grains methylthionin hydrochloride (methylene blue) every 3 hours. In addition one or two enemata high up the colon are given daily. The amount injected is 500 cc. and should be retained 15 minutes. The strength of the aqueous solution used is between 1-500 and 1-200. They quote cases in which this treatment produced good effects. In one case the treatment was continued for 16 days. This patient, who had a heavy infection with *Cercomonas hominis,* was treated in March 1915. In June of the same year he was again seen and had gained 17 lbs. in weight.

B. Blacklock.

McNeil (H. L.). **A New Method of treating Flagellate Infection of the Intestines.**—*Southern Med. Jl.* 1917. July. Vol. 10. No. 7. pp. 544–546.

The author having found the usually recommended methods of treating flagellate infections unreliable has adopted the procedure of direct irrigation of the duodenum. The solution used has the following formula :—

Methylene Blue (med. pur.) ..	grs.	5
Quinin Sulph.	grs.	20
Hydrochloric acid (conc.)	mms.	30
Aq. Dest. qs. ad	O	1

Any form of duodenal tube may be used, but preferably a form having a small tip. The solution is run in warm, the time occupied being 10 minutes, and the injections are given daily for three days, in the morning, the last two injections for adults being of double the amount.

In the evening of each day an enema of 1-5000 methylene blue is given high up the colon. Before treatment the patient is kept on liquid diet for two days and a saline purgative is given the night before the first injection.

Four cases, of which three had infection with Trichomonas and one with Lamblia, were apparently undoubtedly cured by this method, that is, at the expiration of a month the faeces were examined after administering a purgative and no parasites were found.

B. B.

da Silva (Ribeiro). **Trichomonose intestinal: cura pelos enteroclysmos iodicos. Myxedema consecutivo: cura pela thyroidina.**—*Brazil Medico.* 1917. June 16. Vol. 31. No. 24. pp. 201–203.

A male patient of 39 years of age who had suffered from symptoms of dysentery for over a year was found to be heavily infected with

Trichomonas, and no other cause of his symptoms could be discovered. Treatment was undertaken by means of a daily injection of a litre of 1 per thousand of iodine solution. The result as regards the symptoms was good; in twelve days the patient was free from pain, had one motion a day instead of five or six which he previously had, and frequent examinations of the faeces proved negative as regards Trichomonas. A few days later, however, considerable oedema of the lower limbs set in and also slight oedema of the face. The author notes that before treatment there was no sign of cutaneous infiltration. Thyroid insufficiency brought about by excess of iodine absorbed was considered the probable explanation, and the author discusses at some length the views held on this subject. Treatment of the secondary condition by means of thyroid extract rapidly produced good results so that in a month hardly a trace of swelling was observed in the lower limbs and none in the face.

B. B.

CHALMERS (Albert J.) & PEKKOLA (Waino). *Enteromonas hominis* **da Fonseca 1915 in a British Officer.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 756–761. With 3 figs.

The patient referred to in this paper became ill in February 1917 when stationed at Omdurman; the symptoms were loss of weight, lassitude, and periodical attacks of abdominal pain accompanied by diarrhoea. The attacks became more severe until July when he was examined. There were found in the course of microscopical examination of the faeces a number of specimens of *Enteromonas hominis*, besides bacilli and *Blastocystis hominis*; no amoebae or other parasites were seen. Serum agglutination positive with *B. typhosus* up to 1-30 only; all other bacteriological examinations gave a negative result; the patient had been inoculated against *B. typhosus* on two occasions. The parasite is briefly described and reference is made to the previous descriptions of the parasite by the authors.* Treatment consisted of calomel at night in small doses and salines in the morning and the administration of 2 grammes of salol in 24 hours, the patient being kept on fluid diet. The parasites and the symptoms from which the patient suffered disappeared rapidly under this treatment. An attempt to infect a kitten by rectal injection failed.

B. B.

VILLA ALVAREZ (Alejandro). **Trichomonosis intestinal.**—*Repertorio de Med. y Cirug.* 1917. May, June. Vol. 8. Nos. 8, 9. (Nos. 92, 93). pp. 346–360; 397–411.

The author enters into a prolonged discussion of his belief in the pathogenicity of Trichomonas. He quotes at length from criticisms directed against his views and gives his reasons for adhering to his opinion

B. B.

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* *Trans. Soc. Trop Med. & Hyg* 1917. Dec. Vol. 11. No. 2. pp. 93–103. With 1 plate & 1 text-fig.

MIXED AND UNCLASSED DYSENTERY.

MEDICAL RESEARCH COMMITTEE. **National Health Insurance. Reports upon Investigations in the United Kingdom of Dysentery Cases received from the Eastern Mediterranean. III. Report upon Recovered Cases of Intestinal Disease in the Royal Naval Hospital, Haslar, 1915-16** [by P. FILDES] **IV. Report upon Combined Clinical and Bacteriological Studies of Dysentery Cases from the Mediterranean** [by S. R. DOUGLAS].—Special Report Series No. 6. 82 pp. 1917. London: H. M. Stationery Office [Price 1*s*. 6*d*. net.]

These two Reports, published together, are in continuation of those which have already appeared in this Series upon dysentery patients and convalescents from the Mediterranean in 1915 and 1916. [For remarks on No. 5 of this series see this *Bulletin*, Vol. 10, p. 138.]

The first Report gives an account of the work done by Dr. P. Fildes at the Royal Naval Hospital, Haslar, on patients invalided at some earlier period from service in the Mediterranean on account of intestinal disease, *a far larger proportion of these naval cases being convalescent* than in the military series described in Report No. 5. About 13 per cent. of these naval convalescents invalided with intestinal infections could be assigned to the typhoid group, whilst in the military series in the former Report typhoid, as distinct from paratyphoid, infections played an insignificant part in the Mediterranean epidemic. This difference appears to be due to differences in the conditions of inoculation among the naval and military cases respectively. 10 per cent. of Dr. Fildes's cases had not been inoculated. Inoculation was confined to the Royal Naval Division, the great majority of the men in the ships not being inoculated, though they were often landed in the Near East and thus exposed to infection. The incidence of typhoid infections among the uninoculated men who had suffered from some form of infective enteritis was 25 per cent.; whilst among the enteritis convalescents who had been inoculated the incidence was only 8·8 per cent. Dr. Fildes's results thus exhibit in the case of the Navy the practical value of anti-typhoid inoculation, which has been so abundantly demonstrated in the Army.

The second Report by Capt. S. R. Douglas assisted by Capt. L. COLEBROOK and Capt. Parry MORGAN gives an account of the intensive clinical and bacteriological investigation of 29 acute cases who had contracted dysentery in Gallipoli between July and November, in which a systematic search was made for many possible causes of the disease beyond the classical types of infection.

Only 3 of the 29 cases were due to infection with classical dysentery bacilli, but other bacterial types foreign to the normal intestine *occurred in much higher proportion, e.g., Morgan's bacillus, B. pyocyaneus,* and bacilli of other groups, which were systematically investigated, and their pathogenicity established. It would appear that many of these less familiar bacteria are not only capable of producing intestinal disease but may have actually played an important part in the Gallipoli epidemic. Satisfactory results were obtained in the treatment of these infections by the use of proper vaccines and observations were made upon the intermittence of the passage of these organisms by "carriers." It was also shown that

BROWNING and GILMOUR'S "brilliant green" method for the isolation of particular bacteria has a wider application in practice than they originally claimed for it. F. E. Taylor

LEDINGHAM (J. C. G.) & WENYON (C. M.). **Dysentery at Gallipoli.** [Correspondence.]—*Brit. Med. Jl.* 1917. July 7. p. 29.

The aim of this note is to counter the view which has gained ground in this country that the amoebic variety of dysentery was the predominant type on the Eastern fronts, including Mesopotamia. As a matter of fact not more than 20–25 per cent. of the acute dysenterics were amoebic, the rest of course being bacillary. The examination of convalescents returning to this country does not give a true picture of the state of affairs on the respective fronts and this is to some extent the cause of the misconception. E. E. Atkin.

BAHR (Philip). **Dysentery at Gallipoli.** [Correspondence.] — *Brit. Med. Jl.* 1917. Sept. 22. p. 401.
BARTLETT (G. B.). *Ibid.* pp. 401–402.
MAGNER (W.). *Ibid.* Oct. 20. p. 539.

Bahr, working first at Mudros, and then in Egypt, supports the statement of LEDINGHAM and WENYON on the overwhelming preponderance of the bacillary form of dysentery in the Eastern theatres of war, whilst Bartlett and Magner, working in Egypt believe that the large majority of the cases were of amoebic origin. From his experience of dysentery among Turkish prisoners of war from Sinai and the Hedjaz, Bahr concludes that amoebic dysentery is a comparatively rare disease in the inhabitants of the Middle East when subjected to similar conditions as our troops in Gallipoli. Bahr condemns, whilst Bartlett and Magner advocate, the routine use of emetine in the treatment of acute dysentery from Gallipoli and claim that until exact knowledge is obtained concerning the infecting organism or organisms in acute dysentery the routine use of emetine constitutes the only rational treatment. Bahr, on the other hand, considers the indiscriminate hypodermic injection of emetine regardless of laboratory diagnosis is unsound, such treatment having a prejudicial effect on cases of acute bacillary dysentery, which require specific treatment with large doses of polyvalent anti-dysenteric serum and intravenous injection of salines. Where the diagnosis is uncertain and a rapid action is necessary Bahr considers that there can be no harm in simultaneous use of emetine, anti-serum and saline injections.

F. E. T.

CECIKAS (J.). **Masked Dysentery.**—*Grèce Méd.* 1917. Apr. 1–15. Vol. 19. No. 7–8. pp. 13–16.

The author considers that the term enteritis is employed to include a group of diseases of the most heterogenous character. By the examination of the patient's sera by the agglutination test, and by the bacteriological examination of the stools a certain number of these will be found to be cases of dysentery. The details are given of several cases of enteritis which in this way were proved to be cases of dysentery.

F. E. T.

Barratt (J. O. Wakelin). **A Search for Dysentery Carriers among Soldiers coming from Gallipoli and Egypt.**—*Brit. Med. Jl.* 1916. Nov. 4. pp. 617–619.

This investigation was undertaken to determine the extent to which men coming from countries in which dysentery was endemic are likely to be dysentery carriers. The faeces of fifty soldiers who had reached France after service in Gallipoli and Egypt were examined for entamoebae and dysentery bacilli. The soldiers were taken at random, without selection, in the medical wards of the hospital. Seventeen had not had a previous attack of dysentery ; the remaining thirty-three had suffered from previous attacks. Nine were admitted with a diagnosis of dysentery, and in one of these it was stated that *B. dysenteriae* (Flexner) had been isolated from the stools. In no case could entamoebae, motile or encysted, be found, though encysted lambliae were present in three cases. In no case could an agglutinable *B. dysenteriae* Shiga or Flexner be obtained, though in one case an inagglutinable bacillus corresponding in cultural characters to *B. dysenteriae* (Shiga) was found, and in one case a bacillus probably identical with *B. dysenteriae* (Strong) was isolated. Other pathogenic organisms discovered incidentally included *B. typhosus*, *B. paratyphosus* A and *B. paratyphosus* B in one case each, and bacilli allied to Morgan's bacillus No. 1 in two cases. Only three dysentery carriers could be recognised among the fifty men examined, together with two carriers who did not belong to the dysentery group. These investigations show that when soldiers who have had dysentery are admitted into a base hospital the condition of their intestinal tract is ordinarily normal, or rapidly becomes so, any dysenteric lesions quickly subsiding. They also emphasise the danger of troops who are dysenteric subjects bringing dysentery into this country by the agency of carriers. The author considers that the risk would presumably be greater among men leading a more arduous existence, conducing to a recrudescence of their malady, such as obtains in camp life at the front, and it appears desirable that further examinations should be made under the latter conditions.

F. E. T.

Fischer (Walther) & Dold (Hermann). **Gleichzeitige Infektion mit Dysenterie-bazillen und Dysenterieamöben.** [Simultaneous Infection with Dysentery Bacilli and Dysentery Amoebae.]—*Deut. Med. Woch.* 1917. Oct. 4. Vol. 43. No. 40. pp. 1258–1260.

Without making a systematic investigation into the subject, the authors, working in Shanghai, were able to establish the simultaneous infection with dysentery bacilli and amoebae in 7 cases, the Shiga-Kruse bacillus being present in four cases, the Flexner bacillus in two and the Y bacillus in one. They therefore conclude that in districts where both diseases are frequent simultaneous active infection with dysentery bacilli and amoebae not infrequently occurs. They consider that an abnormal leucocyte content in the stool of a case of amoebic dysentery constitutes a useful indication of a simultaneous bacillary infection.

F. E. T.

Rose (F. G.). **Infantile Enteritis in British Guiana.**—*Brit. Guiana Med. Ann.* 1915. pp. 39–41.

Infantile enteritis accounts for a large proportion of the deaths of children under two years of age occurring in the Public Hospital, Georgetown. The patients, usually infants under one year, are generally admitted in a condition of complete collapse, and as a rule death ensues in a day or two from exhaustion or toxaemia. Post mortem the enlarged spleen or inflamed lymph-follicles may simulate typhoid, but typhoid and paratyphoid bacilli cannot be obtained on cultivation.

On bacteriological examination of the faeces, Flexner's bacillus was found four times, the Y bacillus twice, Morgan's No. 1 bacillus once, *Streptococcus pyogenes* five times, and a bacillus of the colon type, of very high virulence, was the only pathogenic organism isolated in thirteen cases.

F. E. T.

Rangel Pestana (Bruno). **Consideracões acerca de alguns protozoario e outros parasitas encontrados em fezes humanas (Resultado de 477 exames de fezes).** [On some Protozoa and other Parasites found in Human Faeces. Results of 477 Examinations.]—*Ann. Paulist. Med. e Cirurg* 1917. May. Vol. 8. Year 5. No. 5. pp. 101–113. With 1 plate.

During the past year the author examined the faeces of 477 persons of whom some were and others were not suffering from intestinal troubles. The results of microscopical examinations were 153 positive, 324 negative. The following table shows the number of cases in which infection with various parasites was discovered; it is reproduced from the author's paper:—

Parasite.	*Cases.*
Blastocystis hominis (Brumpt 1912)	24
Endameba dysenteriae (Councilman & Lafleur 1891)	29
,, ,, & Blastocystis	3
,, ,, ,, and Giardia	1
,, ,, & Flagellates (sp. ?)	1
,, ,, & Chilomastix	4
,, ,, ,, and Taenia ova	1
,, ,, & Tricocephalus, Ascaris & Taenia ova	1
,, ,, cysts	4
Cysts of Endameba with 8 nuclei (*E. dysenteriae* or *hominis* ?)	6
Endameba hominis (Casagrandi & Barbagallo 1897)	4
,, ,, cysts	1
Chilomastix mesnili (Wenyon 1910)	10
,, ,, & Blastocystis	1
,, ,, & Giardia	2
Giardia intestinalis (Lambl 1859)	6
,, ,, cysts	11
Trichomonas hominis (Davaine 1854)	3
,, ,, & Trichocephalus ova	1
Ova of *Ascaris lumbricoides* (Linneu 1758)	12
,, ,, *Tricocephalus trichiurus* (Linneu 1771)	16
,, ,, *Ankylostoma duodenalis* Dubini (1843)	8
,, ,, Taenia	3
,, ,, Ankylostoma and Tricocephalus	1
,, ,, Ascaris and Blastocystis	1

The rest of the paper is concerned with technique and nomenclature, the author giving his reasons for the adoption of various names.

B. B.

FLORAND (A.) & MALLETERRE (F.) **Soixante-cinq cas de dysenteries rebelles récidivantes avec guérison.**—*Bull et Mém. Soc. Méd. Hôpit de Paris* 1917 Feb 8. 3 Ser Vol. 33. No. 3–4. pp 187–193

These 65 cases comprised 14 in which amoebae and cysts were found in the stools, 4 in which Lamblia was found, 2 of bacillary dysentery, 1 Flexner and 1 Shiga, 5 of Trichomonas and 38 of indeterminate pathogenic agents, and had all been treated without success by the usual remedies for dysentery, such as emetine, Dopter's serum, arsenobenzol, silver nitrate, etc. Treatment by the method of CARPENTIER and DE LA MOTHE, namely rest, special diet, and a new vegetable extract, the nature of which is not specified, resulted in complete cure in all the cases.

F. E. T.

STETTNER (Ernst). **Gelenkrheumatismus und Ruhr.** [Rheumatic Joints and Dysentery.]—*Münch. Med. Woch.* 1917. June 26. Vol. 64. No. 26. pp. 854–856. With 2 charts.

This paper is based on an experience of 30 cases of joint affections following in the train of an attack of dysentery. There was usually an interval of 3 or 4 weeks between the cessation of the acute intestinal trouble and the onset of the joint symptoms Conjunctivitis often preceded it, and in not a few cases, urethritis. Some patients suffered from nose bleeding, which first made its appearance while the intestinal symptoms were prevailing, and was repeated throughout the rheumatic stage.

Joints affected.—In all cases the knee was affected, usually on both sides, often the ankle and less frequently the toes. The hip joint enjoyed a comparative immunity. The upper extremity was attacked with less regularity, the elbow and shoulder most often, occasionally the wrist and rarely the fingers Teno-synovitis was observed in the lower extremity twice.

Fever.—This was usually of short duration. When a new joint became affected there was a corresponding slight exacerbation of fever.

Heart complications were present in about 1/3 of the cases. The pulse gave the first intimation that there was something wrong. In the 3rd or 4th week the heart dulness was found to have extended more to the left and a systolic murmur developed at the apex.

Conjunctivitis developed in half the cases and in 30 per cent. of these it was the first symptom so that the patients were received into the ophthalmic department of the hospital. The condition cleared up in the course of a few days. Only 2 relapses occurred and they were severe cases in which the iris was also involved.

Urethritis with discharge of pus from the urethra was observed in 9 cases, in 2 of which it was the first symptom. Gonococcus was excluded. Gram-positive diplococci were present somewhat resembling Pneumococcus. Definite purulent urethritis was always accompanied by conjunctivitis but the converse did not always hold. The discharge usually cleared up in 2–6 days with no other treatment than rest in bed.

The prognosis hangs chiefly on the question of heart complications. Patients should not be moved from one hospital to another too soon :

otherwise relapses are liable to occur. Treatment should be designed to rid the body of the bacterial toxins which are the cause of the lesions. Salicylates and measures to induce sweating are recommended. The intestinal tract, which is the seat of the trouble, must not be overlooked.

E. E. A.

CAWSTON (F. G.). **Ipecacuanha in Chronic Dysentery.**—*Med. Jl. S. Africa.* 1917. Apr. Vol. 12. No. 9. p. 140.

The author gives an account of a case of chronic dysentery. The disease was contracted in East Africa in October 1916. Up till May he had five or six daily evacuations with blood and mucus. Emetine injections 70 in number, magnesium sulphate and paraffin produced no good result. Ipecacuanha was given, 30 grs., preceded by 30 ms of liq. morph. hydrochlor. and each day a reduction of 5 grs. and 5 ms respectively was made in the doses given. The results were excellent, the motions being freed from blood and mucus and reduced to one daily. The cause of the dysentery was not determined. [The period of observation after treatment is not stated.]

B. B.

SEYMOUR (L W.). **The Treatment of Dysentery, Wounds, etc., by a Combination of Internal Antiseptics.**—*Brit. Med. Jl.* 1917. July 28. pp. 115-116.

As a result of 25 years' experience in India and the Persian Gulf, the author advises the internal administration of quinine and carbolic acid in dysentery, but as he appears to regard it almost as a panacea—plague, malaria, septicaemia, erysipelas, puerperal fever and carbuncles all yielding to its action—one wonders whether he has not been deceived in his observations. A prescription and a method of mixing to obtain a clear solution are appended.

E. E. A.

Book Reviews

Laveran (A.). **Leishmanioses, Kala-azar, Bouton d'Orient, Leishmaniose américaine.**—521 pp. With 40 text figures. & 6 plates. 1917. Paris: Masson et Cie [Price 15 fr.]

In a brief introduction the author points out that although Aleppo button has been known since the middle of the eighteenth century it was not until 1882 that kala azar was described for the first time; only in 1903 was it proved that these diseases were caused by parasites very closely related. Notwithstanding the fact that leishmaniasis is widely distributed not only in Asia and in Africa but in Europe and South America, it is still an unfamiliar disease to medical practitioners. The disease is also of importance to veterinary surgeons, as dogs suffer from a form of leishmaniasis which is probably identical with human kala azar and may well play a rôle in the propagation of this infection. During the 14 years which have elapsed since the discovery of *Leishmania donovani* and *Leishmania tropica* very many papers have been published on these protozoa and on the diseases which they produce, but they are so scattered in French and other journals that the practitioner can refer to them only with difficulty. For these reasons Laveran resolved to summarise in a single volume our knowledge on the subject of leishmaniasis.

The opening chapter deals with leishmaniasis in general. The author shows how the supposed differences between *L. donovani* and *L. infantum* disappeared one by one with the accumulation of experimental evidence and that consequently the designation *L. infantum* must be dropped in favour of the older name *L. donovani*. A detailed account of the geographical distribution of the various forms of leishmaniasis is given. Clinically leishmaniasis is met with in man in two distinct forms—visceral leishmaniasis or kala azar and cutaneous leishmaniasis or Oriental button, of which American leishmaniasis appears to be a variety. A study of the distribution of kala azar and that of Oriental button tends to demonstrate that we are concerned with two morbid entities clearly distinct, rarely endemic in the same localities and never observed in the same subject. Similarly in naturally infected dogs the two forms, visceral and cutaneous, are met with.

Some ten pages are devoted to an account of the technique required for the study of the parasite, its staining and cultivation.

In the pages dealing with the position of Leishmania in nomenclature an interesting summary is given of the work of Laveran and Franchini, Fantham and Porter and others on induced leishmaniasis.

The remainder of the volume is divided into four sections which deal respectively with:—

1. Visceral Leishmaniasis or Kala Azar.
2. Canine Leishmaniasis.
3. Cutaneous Leishmaniasis or Oriental Sore
4. American Leishmaniasis of the skin and mucous membranes.

Each section is complete in itself and deals exhaustively with the subject concerned. For example the section dealing with visceral kala azar is divided into twelve parts:—(1) Historical. (2) Geographical distribution. (3) Etiological factors such as age, sex, race, climatic conditions, etc. (4) Leishmaniasis in the child and in the adult. (5) Experimental work in animals. (6) Pathology. (7) The parasite *Leishmania donovani* (8) Treatment. (9) Diagnosis. (10) Prognosis. (11) Treatment, and (12) Prophylaxis. The other three sections are equally comprehensive.

With regard to the value of intravenous injections of tartar emetic in the treatment of Leishmania infections, Laveran points out that the credit of the discovery belongs to Gaspar Vianna who in 1913 published his observations on the value of this drug in American leishmaniasis. The following year, 1914, Castellani treated a case of Indian kala azar by intravenous injections of tartar emetic, and Fowler's solution and his yaws mixture orally; he attributed the remarkable amelioration obtained to the use of tartar emetic. Di Cristina and Caronia (February 1915) were the first to use intravenous injections of tartar emetic in Mediterranean kala azar and later in the same year (July 1915) ROGERS published observations on the use of the drug in Indian cases.

The general plan of the volume is that adopted by the author and MESNIL in their classical work "*Trypanosomes et Trypanosomiases.*" It is unfortunate that a volume containing so much information and entailing in its production such an enormous amount of labour should to some extent suffer in usefulness from the lack of a detailed index. References are given at the foot of the pages, and at the end of the book is a table of contents, but personal experience in the use of "Trypanosomes et Trypanosomiases" has impressed the reviewer with the fact that the absence of a complete index in volumes of such value as books of reference, is an undoubted loss.

It is impossible to write too highly of the merits and value of this book. As Laveran claims in the introduction, the time had arrived when it was most desirable to summarise in a single volume our present knowledge of Leishmania infections. This was the author's aim and he has accomplished it in the same careful and thorough manner which characterises his previous works "Paludisme" and "Trypanosomes et Trypanosomiases." To those familiar with these volumes one need not say more in commending "Leishmanioses."

W. Yorke.

BRAHMACHARI (Upendranath) [M.A., M.D., Ph.D., Rai Bahadur]. **Kala Azar. Its Treatment.** With a Foreword by the Hon. Surgeon-General W. R. EDWARDS [C.B., C.M.G., M.D., I.M.S.].—v+ 123 pp. With 6 plates & 17 charts. 1917. Calcutta: Butterworth & Co., Ltd. Price 8*s.* 6*d.*

Readers of this *Bulletin* are familiar with the author's previously published work upon the treatment of kala azar [Vol. 8, pp. 5 and 406].

This little book is a compendium of the subject in all its aspects. It contains 116 pages of text and is divided into twelve chapters. The first four of these, occupying 32 pages, describe, with numerous details of cases the older methods of treatment by alkaloidal therapy, production of leucocytosis, alkalies, bone-marrow and extracts of ductless glands, vaccines, mercury, arsenic and some other drugs, and X-rays.

Chapter V deals with treatment by means of antiseptics. It is shown that formaldehyde in the few instances in which it was tried acted like a specific. The three succeeding chapters, comprising half of the volume, discuss treatment by means of antimonial preparations. Their respective values in trypanosomiasis and kala azar are assessed, their doses are given, and the methods of administration and indications for their use are described. Their toxicity is discussed, and the symptoms of poisoning which may arise in the course of treatment are clearly set out. The question of retention of antimony in the system is concisely dealt with, it being shown that when introduced into the circulation in metallic form it remains in the liver and spleen for a much longer time than when injected as a soluble salt. A large number of antimonyl preparations have been tried, for the first time, by the author, such as, for instance, antimony metalone, aniline emetic, lithium antimony tartrate, and luargol (a compound of antimony, silver and arsenic). The results of these trials are described, but it is difficult to estimate their value on account of the small number of cases treated. Chapter IX is devoted to a short account of two cases which, at the time of going to press, were under treatment by intravenous injections of a 1% solution of bismuth-sod-tartrate in distilled water, with apparently satisfactory results. This drug has not hitherto been tried in kala azar. Chapter X discusses colloidal therapy and combined therapy. It will be remembered that colloidal metallic antimony was first used by the author. The method of preparation is described in another part of the book. The section on combined therapy discusses the probable advantages of uniting the action of various drugs such, for instance, as antimony, arsenic, and formaldehyde.

The concluding two chapters deal with the treatment of complications, dietetic and hygienic measures, and prophylaxis, and the author closes with a forecast in which he looks ahead with confidence to the time when a colloidal preparation of antimony will be produced, capable of effecting, in minute doses, an absolute destruction of Leishmania in the body though itself almost or completely non-toxic.

The book is written in a clear and concise manner and should prove useful and suggestive to those interested in the treatment of kala azar. Many of the cases described are well illustrated by temperature charts and tables showing the result of blood examination. A full account is given of the technique for intravenous injection and the apparatus is pictured. A few orthographical errors will doubtless be eliminated in future editions.

E. J. Wyler.

CROWE (H. Warren) [M.D., Oxon] & SPRAWSON (C. A.) [M.D., M.R.C.P., I.M.S.]. **Consumption. Treatment at Home and Rules for Living.**—37 pp. 2nd Edition. With Sample Chart for Temperature and Pulse. Calcutta: Butterworth & Co. (India), Ltd. 1917. [Price As. 8 net]. Also in Urdu 72 pp. (same Publishers). [Price As. 8 *net.*]

Some little time ago Dr. Warren Crowe wrote a little shilling book with the above title for use in temperate climates. Major Sprawson has adapted the work for use in India or any similar region. Its rules are for guidance of those who must be "up and about" and get what treatment they can in their own homes. Dwellers and workers in India who already possess the eighth edition of "Moore's Family Medicine and Hygiene for India" will find similar simple rules on page 215. Little comment is needed. The "Rules" in this little book, when they can be, and are, carefully carried out will do much to relieve suffering and may, if the tubercular disease of the lungs is in an early stage, help towards cure. The value of a respirator under certain conditions is not mentioned, and with regard to Rules 15, 16 and 17 (exercise) it should be laid down that in climates like that of India where even slight exertion is followed by free perspiration, the body should be covered by a warm wrap or overcoat after exercise. At such times a "chill" is a serious matter. Not only does it destroy the good done by exercise but it will seriously affect any process of auto-inoculation that may be taking place.

The cheap Urdu version brings help to educated Mahomedans. No doubt similar editions for Bengalis and Hindi-speaking races will be published. But no book, however cheap and simple in diction, can reach the remaining illiterate millions. Some of these get help and advice from neighbouring Hospital or Dispensary but of millions it must be said that nothing can reach them at present. Since these must toil to live their ignorance may be a partial blessing. For as Montaigne wrote of the French peasant of the 16th century:—"The names by which they call their maladies take off the edge and soften them; phthisis is to them a cough, dysentery only a looseness, pleurisy no more than a stitch; and as they name them gently so they bear them."

J. H. Tull Walsh.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 11.] 1918. [No. 2.

HELMINTHIASIS.

KOBAYASHI (H.). **[On the Life-History and Morphology of the Liver Distome** *Clonorchis sinensis*.] [English text.]—*Mitteil. a. d. Mediz. Fachschule z. Keijo.* 1917. pp. 251–284. With 5 plates.
[Abstract from Review by R. G. MILLS.]

The chief facts of the life cycle of *Clonorchis sinensis* have already been communicated by this author [see this *Bulletin*, Vol. 8, p. 183]. The present paper adds considerable detail to previous knowledge, especially in relation to the question of duality of species within this genus as hypothesized by Looss.

Clonorchiasis in Japan is caused by the consumption of raw or partially prepared cyprinoid fishes. To the list previously given is added *Leucogobis mayedae*. *Carassius auratus* is the least heavily infected, but is the most injurious.

It was experimentally ascertained that the encysted larvae are killed at 100° C., but retain their vitality for at least fifteen minutes at lower temperatures. In vinegar and soy-sauce they survive five hours. In the refrigerator the larvae within the fish remain alive for several days. If kept at ordinary temperatures they die as soon as the fish putrifies.

Details are given of the development of the young distome in the final host. The worms attain sexual maturity in 26 days and the eggs are found in the faeces.

The occurrence of spines on the skin has caused confusion in the identification of this form. In the young distomes spines are present. They disappear in the full-grown specimens.

Looss differentiated *Clonorchis sinensis* and *Clonorchis endemicus* on (1) size, (2) discontinuity of vitellaria, (3) interstitial pigmentation, (4) size and shape of egg.

The author shows that size of the adult is related to intensity of infection of the host, and that there is in experimentally reared forms no constancy either in the discontinuity of the vitellaria or the occurrence of interstitial pigment; the larger forms are generally pigmented and have discontinuous vitellaria and this is probably due to age. In the shell quite the reverse in shape is met with in some instances. From these facts the author concludes that in Japan there is only one species and that *Clonorchis sinensis* and *Clonorchis endemicus* are synonymous.

R. T Leiper.

(C436) Wt.P2/33. 1,400. 2.18. B. & F. Ltd. Gp.11/3.

QUERENS (Percy Lennard). **La presencia del *Chlonorchis sinensis* en Cuba Oriental.**—*Rev. Med. y Cirug. Habana.* 1917. June 25. Vol. 22. No. 12. pp. 297–304.

The Occurrence of *Clonorchis sinensis* in Eastern Cuba. (Translation.)—*New Orleans Med. & Surg. Jl.* 1917. Dec. Vol. 70. No. 6. pp. 500–506.

History of the case of a Chinaman, aged 31, a native of Canton, who had lived in Cuba for eight years in a condition of otherwise perfect health. For the last four years, however, pain had been felt, with a sensation of weight, in the region of the liver, to which more recently had been added vomiting after meals and abundant diarrhoea. On admission to hospital the patient exhibited much emaciation and loss of flesh. The skin and conjunctiva had a slight icteric tint. The muscular system showed great flaccidity and the pupillary reflex was sluggish. It responded, however, both to light and accommodation. Cremasteric and patellar reflexes were negative, and Babinski's sign positive. A haemic murmur was audible in the heart and great vessels. The area of hepatic dulness was much diminished, while the spleen could not be felt. Ova of *Clonorchis sinensis* were found in the stools. The examination of the blood revealed a high degree of anaemia, and also the presence of malarial parasites. The patient died after a stay of six days in hospital, from a continuance of the vomiting and general weakness, quinine having been given on account of the presence of parasites in the blood. An autopsy could not be obtained, but the author ascribes the death to infection with Clonorchis. This is the first case reported from Cuba. [But actually there is no ground for assuming that the infection was acquired since leaving China.—R.T.L.]

J. B. Nias.

NAKAGAWA (Koan). **Human Pulmonary Distomiasis caused by** *Paragonimus westermanni.*—*Jl. Experim. Med.* 1917. Sept. 1. Vol. 26. No. 3. pp. 297–323. With 10 plates.

Paragonimiasis is extremely prevalent in Northern Formosa; 4·3 per cent. of the pupils of all the public schools in the Prefecture of Shinchiku were found to be suffering from the disease. Among the savage tribes about half of the total population were infected. Attempts at miracidial infection showed that *Melania libertina* and *M. obliquegranosa* have some selective affinity but efforts to keep the molluscs alive failed. As *Melania libertina* was the only species that lives in the thickly infected regions it was assumed that a cercaria with an oval spine found in this snail was the larva of the Paragonimus. These cercariae were also found on one occasion in *Melania tuberculata.* The second intermediate host was ascertained to be the crab. An encysted cercaria bearing a striking resemblance to that found in Melania was observed in three species, viz., *Potamon* (*Geothelphusa*) *obtusipes, P. dehaani* and *Eriocheir japonicus.* Of these the first shows the largest percentage of natural infections, the second a much smaller and the last is but rarely infected. *Astacus japonicus* is another intermediary in Korea—and *Sesarma dehaanii* has been implicated in Japan. The encysted cercariae are found in the gills, liver and muscle and have an elongated dark excretory vesicle in the middle of their bodies. Fully grown encysted cercariae when fed to dogs develop into mature worms in the lungs and begin egg-laying in about ninety days. The encysted cercariae after ingestion are liberated in the intestine and bore through the jejunum into the abdominal cavity. They then pierce the diaphragm, enter the thoracic cavity, and passing the pleura, reach the lungs where they form cysts in the parenchyma and become adults.

Although non-infected crabs were difficult to obtain, experiments were carried out which successfully established on an experimental basis the link between the cercariae found in *Melania* and the encysted forms in the crab. These encysted cercariae vary in size and shape with age. The younger are chiefly found in the liver while the older chiefly occur either in the liver or gills. Full grown forms are contained within a cyst from 0·26 to 1·0 mm. by 0·4 mm. The cyst has a characteristically thick wall. Under natural conditions the cysts seem to detach from the gills and drift in the stream which thereby becomes a source of infection. Newly hatched cercariae do not resist even slight temperature changes. Free living cercariae may be swallowed by man with water or food without harm. Within the cysts on the other hand they are hardy and withstand, for quite a time, immersion in solutions of salt, soya sauce and vinegar. Hence crabs are dangerous unless they have been in soya sauce or vinegar for two hours or more after their carapaces are removed. The eating of raw or imperfectly prepared crabs and the drinking of river water from crab-infested regions are the two principal causes of pulmonary distomiasis.

[The developmental stages throughout the life cycle from miracidium to adult are beautifully illustrated, and the experimental evidence is throughout supported with an admirable wealth of detail.]

R. T. L.

ANDO (R.). **[Experimental Treatment of Pulmonary Infection with *Paragonimus westermanii* with Emetine Hydrochloride.]**—*Taiwan Igakukai Zasshi.* (*Jl. Formosa Med. Soc.*) 1917. Mar. 28. No. 173. pp. 200–201.

[Abstract from Review by R. G. MILLS.]

The results of experiments on infected dogs encouraged the author to try the effect of the daily injection of emetine on patients. In severe cases 23 injections decreased the excretion of eggs in the sputum but did not entirely stop the disease. Nine injections seemed to check its course in some cases of slight infection. The author was seemingly pleased with the degree of improvement noticed in all.

R. T. L.

SALOMON & NEVEU (R.). **Hémoptysies parasitaires chez les soldats indigènes d'Extrême-Orient. Le *Paragonimus westermanni*.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Mar. 8. 3 Ser. Vol. 33. No. 7–8. pp. 388–394.

The authors have observed among Annamite and Indochina native troops serving in France cases of haemoptysis due not to tubercle but to *Paragonimus westermanni.* They express the fear [which need not arise on the known life cycle of the parasite] that the infection may be spread in Europe. Clinical notes are given of four cases. In the first, a native of Hué, Annam, there was no fever; the sputum was nummular, thick and purulent, tinged red with blood. Numerous eggs of Paragonimus were found microscopically. The case had been diagnosed as chronic bronchitis. The other three cases showed generalised bronchitis with haemoptysis but the clinical diagnosis could not be confirmed by microscopical examination of the sputum owing to the war exigencies. The paper concludes with a brief summary of the known facts regarding the distribution and clinical signs of this parasitic affection.

R. T. L.

MUTO (M.). **[The First Intermediate Host of *Metagonimus yokogawai.*]** —*Kyoto Igaku Zasshi.* (*Kyoto Jl. Med. Sci.*). 1917. Jan. Vol. 14. No. 1. pp. 115–134.

[Based on Review by R. G. MILLS.]

The author has found *M. yokogawai* in persons from Kaishu, Korea. In this district various snails were examined and *Melania libertina* was found infected in from 2 per cent. to 50 per cent. with a redia and cercarial form. The cercaria has a long simple tail, oral and ventral suckers. The mouth is guarded by 4–6 spines. There are two black eyespots in the second fifth of the body. The tail measures 0·286 mm. and the body 0·2296 mm. The livers of snails infested with this larval stage were broken up and added to water in which uninfected gold fish were kept. Later encysted cercariae were found under the scales and in the tissues at the base of the tail and fins. The muscles were entirely free from cysts. Kittens were then fed with the infected fish and in 12 to 15 days were invariably found infected. The eggs as passed in the faeces are elliptical in shape, light-yellowish in colour and provided with a double wall that has a small projection from the blunt end and a small crescent shaped operculum at the other: they measured 0·033 mm. by 0·021 mm. Sometimes they were obtained only 0·024 mm. by 0·0128 mm. [*Melania libertina* has already been implicated as the primary intermediate host of *Clonorchis sinensis* and *Paragonimus westermanni.*]

R. T. L.

FERGUSON (A. R.). **Some Notes on Bilharziasis.**—*Jl. Roy. Army Med. Corps.* 1917. July. Vol. 29. No. 1. pp. 57–65.

These notes usefully summarise the chief facts of importance regarding the history, geographical distribution, structure, etiology and pathology of bilharziasis more particularly as seen in Egypt. It is mentioned that an outbreak of rectal bilharziasis has recently occurred amongst the Australian troops quartered at Tel-el-Kebir.

Although the eggs usually occur in the wall of the bladder and rectum the author's researches lead him to conclude that ova may exist in comparatively small numbers in many other tissues and organs of the body in comparatively small numbers without inducing such pathological changes as would give rise to clinical symptoms.

When however they occur in the spinal cord, as in certain cases of chronic bilharziasis seen from time to time in Egypt, somewhat anomalous groups of symptoms referable to the lower part of the spinal cord make their appearance in the later stages. Sometimes these symptom-groups will imitate locomotor ataxia and sometimes disseminated sclerosis. In such cases completely calcified ova, surrounded by well-marked signs of neuroglial hypertrophy, can be found on microscopical examination. In the female the uterus and ovaries may be invaded by the Bilharzia ova in considerable numbers and in some cases the ovaries may be so altered by a chronic oöphoritis that this form of infection persisting from infancy must undoubtedly be a cause of sterility in young married native women.

The author's observations abundantly confirm the view that whereas the lateral-spined eggs are mainly discharged in the faeces they may occur in the urine, while the terminal-spined eggs largely predominating in the bladder may be fairly evenly mixed with lateral-spined eggs in the faeces.

R. T. L.

Morel (L.) & Maldonado (I.). **Réflexions suggérées par quatre observations de bilharziose vésicale.**—*Jl. d'Urologie.* 1917. Aug. Vol. 7. No. 1. pp. 27–37.

Clinical notes are given of four cases of bilharziasis met with in France. Of these three came from West Africa. The fourth case is however of especial importance as the patient, age 27, was born in Cochin-China, resided in France until 1909, and returned to Cochin-China for eighteen months' service. He then returned to France and was mobilised in 1914. In 1915 coloured urine was passed for the first time. In 1917 he was demobilised for haematuria. Many eggs of *Schistosoma haematobium* were found in the urine. The authors find that the various remedies advised have no permanent influence on the disease. Emetine, recommended by Bouilliez in 1915, was tried without success in one case. Neo-salvarsan appeared to lower the number of eggs eliminated during the exhibition of the drug but had no prolonged effect after treatment was suspended. The parasites were obviously not killed and renewed their activity.

R. T. L.

Potts (J. L.). **A Case of Recurrent Bilharziosis.**—*Jl. Trop. Med. & Hyg.* 1917. May 15. Vol. 20. No. 10. p. 110.

A patient at the age of 14 became infected with *Schistosomum haematobium* in 1912 while living in Northern Transvaal. There was haematuria, pain on micturition and pain in the kidneys, most marked when lying down. The attack lasted three months and the symptoms then completely disappeared.

In November 1916 the patient came from Africa to England and in the following March had a recurrence of symptoms. Terminal spined eggs were found in the urine. This gives an incubation period of five months for the second attack. There is no reason to believe that the first attack had not been completely cured. The patient frequently bathed in the rivers and was then continually exposed to re-infection. The differential leucocyte count gave polynuclear 47·4 per cent., eosinophile 9·4 per cent., large mononuclear 4·7 per cent., lymphocytes 37·5 per cent., mast cells 0·7 per cent. The considerable fall in the polynuclear cells and the increase in the lymphocytes appears as an unusual feature.

R. T. L.

DIAMANTIS. **Quelques considérations sur le mode d'infestation de l'homme par le** ***Schistosomum haematobium.***—*Jl. d'Urologie.* 1917. Aug. Vol. 7. No. 1. pp. 9–16.

The author discusses from the standpoint of the clinician the relative merits of the three hypothesis of infection in bilharziasis, viz, penetration (a) by the mouth, (b) through the skin, (c) by the perineal appendages. He believes that the differences between the extent of infection in males and females is to be explained best on the last hypothesis. The religious ablutions six or seven times daily imposed on the Mussulman are rarely practised by the women. The dorsal vein of the penis probably plays an important part in the direct infection of the bladder wall, and this explains the relative frequency of vesical over rectal lesions.

R. T. L.

LUTZ (Adolpho). **Observações sobre a evolução do** ***Schistosomum mansoni.*** **(Segunda nota prévia.)** [Observations on the Development of *Schistosomum mansoni.* Second Preliminary Note.]—*Brazil Medico.* 1917. Mar. 10 & 17. Vol. 31. Nos. 10, 11. pp. 81–82; 89–90.

The author continues in this paper his account of the development of the cercariae of *S. mansoni* as observed in *Planorbis olivaceus* [for the first part see this *Bulletin*, Vol. 9, p. 271]. The development proceeds as described by LEIPER, whom the author can confirm in all essential particulars. The cercariae have on their heads a ring of six or more small points, like the crown of a trephine, which may be considered to be a boring organ. This feature is not mentioned by LEIPER, but the Japanese observers have noted it, in *S. japonicum*, without however attributing to it any importance. The buccal sucker, oval in form, appears to have its muscles very little developed, but its base can be protruded like a proboscis, and perhaps helps in the act of perforation. The forked part of the tail forms a separate portion, and is bent at right angles to the body of the cercaria, when it is floating on the surface of the water, so as to form a float, from which the body depends. In swimming the tail vibrates rapidly, and makes the cercaria very visible. Examination of the infected molluscs shows that the cercariae develop in sporocysts, occurring in great numbers in the liver and hermaphrodite gland, and in this way they produce a state of very considerable marasmus which proves fatal to the snail. The longest period over which an infected snail was kept under observation was three months.

To infect laboratory animals with cercariae, the author pours water containing them into the ears of rabbits, and with smaller animals, like guinea-pigs, he applies the liquid to the shaved surface of the abdomen, by means of a glass tube shaped like a Fergusson's speculum. At the end of from ½ to 1 hour the liquid will be full of detached tails, showing that the cercariae have penetrated the skin, the animal being tied down suitably meanwhile by means of straps of gauze. Some irritation may ensue at the seat of inoculation, which is indicated by the scratching of the animal. The animals generally support the inoculation well. In a rabbit which died from an accident, the mesenteric veins were found full of parasites. Adult worms were observed with sexual organs well developed within 5 or 6 weeks from the time of inoculation.

The distribution of *S. mansoni* in Brazil probably corresponds to that of *Planorbis olivaceus*, a species principally found in the north of Brazil, living in fresh water, especially in stagnant pools with much aquatic vegetation. Bathing in such pools and drinking from them should therefore be rigorously avoided. The States of Bahia, Sergipe and Piauhy possess this mollusc, and possibly also Parahyba and Pernambuco. South of Bahia it has not been hitherto found.*

J. B. N.

ITURBE (Juan). **Distribución y profilaxia de la *Bilharzia mansoni* en Caracas.**—*Gaceta Med. de Caracas.* 1917. Apr. 30 Vol. 24. No. 8. p. 70.

A paper of purely local interest describing the localities immediately round Caracas in which *Planorbis guadelupensis*, the host of *B. mansoni*, is found. It is recommended to run dry all such water courses every three months for 10 to 15 days, in order to destroy the snails, and for small pools of water to add sulphate of ammonia in sufficient quantity. As the female snail carries her eggs within the shell, the ova are destroyed with the parent. LEIPER's further recommendations are also quoted, viz., to add a gramme of *alquitrán* [? = cresol] to every 10 litres of water for a bath, and a gramme of bisulphate of soda per litre to all drinking water.

J. B. N.

ZUELZER (Margarete). **Kurzer Beitrag zur Kenntnis der Jugendstadien von *Bilharzia haematobia* (*Schistosomum haematobium.*)** [The Early Stages of *B. h.*]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Sept. Vol. 21. No. 16. pp. 269–275. With 3 text-figs.

This paper deals with observations on the eggs and miracidia obtained from an Egyptian with urinary bilharziasis. It is known that within their egg-shells the miracidia can remain alive in the tissues of the living body for years. When passed in urine they die after several hours. At a temperature of from 4° C. to 10° C. the eggs can be kept without losing their vitality for eighteen weeks in Ringer's solution. The miracidia do not survive when the eggs are exposed to frost. This susceptibility to cold is regarded as of epidemiological importance. At the optimal temperature of 37° C. about 95 per cent. of the eggs hatch within about 15 minutes giving rise to actively motile miracidia. The miracidia have two transverse rows of stout cirri among the ciliated covering. The anterior row comprises 16 cirri, the posterior 18 to 20 cirri.

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* [*Planorbis guadelupensis* more recently implicated by ITURBE in Caracas is very similar to, if not identical with, *P. olivaceus*.—R.T.L.]

Experiments were made to ascertain the effect on the living miracidia of serum from the guinea-pig, from normal man and from a person infected with bilharziasis. In every case the miracidia died within thirty minutes. With serum and with bile from the case of bilharziasis the lethal action was more rapid. On the other hand living eggs injected into the peritoneal cavity of guinea-pigs were found unchanged after eight days and when placed in warm water gave active miracidia.

R. T. L.

CAWSTON (F. G.). i. **The Cercarial Infection of South African Snails.** —*Med. Jl. S. Africa.* 1917. July. Vol.. 12. No. 12 pp. 183–189. With 12 text-figs.

ii. **Snails as Intermediary Hosts.**—*S. African Med. Rec.* 1917. Aug. 11. Vol. 15. No. 15. pp. 234–236.

iii. **Bilharzia in Pools.**—*Ibid.* Oct. 27. No. 20. pp. 313–314.

i. One thousand five hundred specimens of freshwater snails were collected and examined in Natal during 1916. Two hundred and eleven specimens harboured cercariae of various kinds. Not uncommonly more than one form of cercaria was met with in the same snail. In *Planorbis pfeifferi* the *Cercaria catenata* occurred in 30 per cent. during May, June and July at the Toll Gate Brickfields, Durban. In *Physopsis africana* and in two specimens of *Limnaea natalensis* from the Umsindusi leptocercous cercariae were obtained; 99 specimens of *Physopsis africana* harboured furcocercous cercariae. They were of various forms. All were distomes " possessing a divided gut and none showed any indication of a pharynx." Those obtained from Durban were slightly larger than those from the Umsindusi. Specimens of *P. africana* collected from the Umsindusi during the winter months were often infested with furcocercous cercariae which showed no sign of pharynx. Two distinct types occurred often in the same specimen. At Durban brickfields 23 specimens of *P. africana* contained schistosome cercariae. Efforts to infect animals have so far given no positive result although the cercariae are similar to those successfully injected into a guinea-pig by Dr. J. G. BECKER. Experimental infection of *P. africana* with miracidia resulted in the find of a small sporocyst containing undefined cercariae throwing out branches throughout the liver substance in one specimen. At the end of a fortnight a similarly young sporocyst occurred in a second specimen which also contained undeveloped furcocercous cercariae. At the end of three weeks 14 out of 31 specimens were found to harbour Bilharzia cercariae whereas another series used as a control gave only 15 per cent. natural infections. In further experiments the infected forms found were 37 per cent. and 27 per cent. as contrasted with 22 per cent. and 23 per cent. No other species was found susceptible. Twenty examples of *Isidora compta* found in the Umsindusi, at Goodwill's Dam, were free from natural infection.

ii. The author gives a brief summary of the various hosts which are now known to transmit trematode infections of man in different parts of the world, and gives statistics of local infections of snails at Toll Gate, Durban, during 1916, with "tadpole" and bifid tailed cercariae.

iii. In view of the fact that Dr. Becker has shown experimentally that *Physopsis africana* is the intermediate host of a Bilharzia worm in South Africa it has been suggested that an attempt be made to determine how far the distribution of this snail corresponds with the distribution of bilharziasis. The author has accordingly examined pools reputed to be dangerous at Toll Gate, Durban, at Avoca and recently the source and tributaries of the Crocodile River, a branch of the Limpopo. At Durban Physopsis were found naturally infected. At Avoca non-infected snails were obtained in large numbers. No Physopsis were obtained from the river above the factories at Magaliesburg but a bathing pool along the course of the river gave heavily infected forms. At Mulder's drift none of the species was found but an overflow pool on one of the farms gave large numbers of uninfected Physopsis. At Rustenburg suspected stagnant pools on the Kloof river showed two out of seven Physopsis infected. Several uninfected specimens came from the Hex river. At Scheerpoort the river seemed clear of rushes and gave no shells. In a spruit leading from a dam which was also clear of reeds 1 Ancylus, 3 Limnaea, 1 *Planorbis pfeifferi* and 3 Physopsis were recovered but none showed cercariae. Most of these pools could be filled in or the rushes removed. The use of cyanide or lime might succeed in keeping these agreeable bathing places free from the intermediary host.

R. T. L.

Diamantis. **Sur un nouveau traitement de l'hématurie bilharzienne en Egypte.**—*Jl. d'Urologie.* 1917. Aug. Vol. 7. No. 1. pp. 17–25.

From his results with thirty cases the author claims that in simple, non-septic, bilharzial haematuria emetine given intravenously in doses of ·05–·1 per injection has a specific anthelmintic action.

R. T. L.

Stewart (F. H.). **Note on Ascaris Infection in Man, the Pig, Rat, and Mouse.**—*Indian Med. Gaz.* 1917. Aug. Vol. 52. No. 8. pp. 272–273.

A further series of experiments have shown that ripe eggs of *Ascaris* of the pig hatch in the intestine of that animal and pass through the liver and lungs to the trachea as had been previously ascertained when the animals used for experiment were rats and mice. If the infection is massive acute inflammation of the lungs results from the passage of the larvae. Six pigs were infected and killed after varying periods to study the later developments of the ascarids. In five cases no intestinal worms were found and in the other the infection is not regarded as attributable to the experimental feeding. Considering the large numbers of eggs used the author considers the evidence of these experiments as directly opposed to the theory of direct development without an intermediate host. He maintains that on present evidence the invasion of the lungs with the larvae in the pig and in man is an accidental circumstance, not part of the normal cycle, and that the rat and mouse are essentially intermediaries, from the faeces of which the pig and man become secondarily infected.

R. T. L.

LANE (Clayton). i. ***Ascaris lumbricoides* and Coprophagia.**—*Indian Med. Gaz.* 1917. Aug. Vol. 52. No. 8. pp. 269–272.
ii. **Major Stewart on Ascaris Infection.** [Correspondence]—*Ibid.* p. 301.

Reviewing STEWART'S work on the experimental infection of rats and mice with larvae from eggs of *Ascaris lumbricoides,* Lane supports the view advanced in the editorial of the *British Medical Journal* and held by others that the rats and mice act as facultative not as essential hosts and that the experiments prove that the larvae make the vasculo-pulmonary circuit as a necessary preliminary to intestinal infection of the definitive host. Similar experiments made on a guinea-pig with larval *Necator americanus* by the Anaemia Commission are quoted effectively to illustrate this contention.

R. T. L.

STEWART (F. H.); LANE (Clayton). **The Life-History of *Ascaris lumbricoides*.** [Correspondence.]—*Indian Med. Gaz.* 1917. Oct. Vol. 52. No. 10. pp. 379–380.

Major Stewart deals *seriatim* with the criticisms and analogies advanced by Lieut.-Col. Lane in a paper and letter in the August issue of the *Indian Medical Gazette* dealing with Stewart's interpretation of his recent experiments on the life-cycle of *Ascaris lumbricoides.* Stewart had taken the ground that his experimental animals, viz., rats and mice, were not simply facultative hosts but were actually real and essential intermediaries in the normal transmission of *Ascaris lumbri oides.* In his reply Lane admits that the proof of direct infection is markedly weaker than he had supposed but he maintains this view, independently formed from that expressed in a *British Medical Journal* leader, that the experiments and other facts advanced by Major Stewart are satisfactorily explicable only on the supposition that Ascaris larvae make the vasculo-pulmonary circuit in every animal into which penetration is possible, including man, and that the occurrence of this phenomenon in the rat cannot be accepted as evidence that this is an intermediary host for *Ascaris lumbricoides.*

R. T. L.

HALL (Maurice C.). **The Longevity of Adult Ascarids outside the Body of the Host. Its Bearing on Anthelmintic Treatment.**—*Jl. Amer. Med. Assoc.* 1917. Mar. 10. Vol. 68. No. 10. pp. 772–773.

The preliminary fasting and purgation prior to anthelmintic treatment is of course a very desirable procedure but its utility, according to the author, lies in the removal of the bulky food mass which might protect the worm from the action of the drug and not, as has been supposed by some, in forcing a fast upon the worms so that they will greedily absorb the anthelmintic. *Ascaris suum* were kept alive in Kronecker's salt solution (physiological salt solution containing 0·06 gm. per litre) for from fifteen to twenty-six days.

R. T. L

BALLIANO (Arturo). **Sopra la presenza di un'ascaride lombricoide nella cavità pleurica destra.** [Presence of an *Ascaris lumbricoides* in the Right Pleural Cavity.]—*Giorn. d. R. Accad. Med. di Torino.* 1917. Jan.-Feb. Vol. 80. No. 1–2. pp. 185–193.

The case was that of a female child, aged two-and-a-half years, who for eight months previously had suffered from violent and incessant cough, night-sweats, loss of flesh, gastro-intestinal disturbances and attacks of fever. The condition had been ascribed to tubercle. More recently the mother had noticed the presence of a swelling of the size of a nut, in the right costal region, which subsided when the child was quiet.

An examination made by the author disclosed the presence of fluid in the right side of the chest; the tumour was found to be an extravasation of the pleural contents under the skin. An incision was made under chloroform into the eighth intercostal space in the axillary line, at the site of the tumour, and a portion of rib was also resected. The operation gave exit to a large quantity of yellowish-white turbid fluid, containing masses of fibrin, and also to a round worm, 10 centimeters in length, which had been lying in the cavity. In the hurry of the operation it was not noticed whether the worm showed signs of life at the time of removal, but it seemed to be in a fresh condition. The patient made a good recovery. There was no sign of communication between the pleural cavity and the bowel, as evidenced by faecal contamination, so that the exact mode of penetration of the worm into the pleural sac remained a matter of doubt.

J. B. N.

STEBER. **Zum Verlaufe und zur Behandlung schwerer Spulwurm-Erkrankungen.** [The Course and Treatment of Severe Round-Worm Infection.]—*Deut. Med. Woch.* 1917. Aug. 16 Vol. 43. No. 33. pp. 1040–1041.

In two children the presence of numbers of *Ascaris lumbricoides* was found, at operation, to explain abdominal symptoms. In one case after unsuccessful treatment with calomel and santonin for two days, Oleum chenopodii with castor oil was given. The worms were quickly expelled. In the second case the patient died from cerebral intoxication before the worms could be removed.

R. T. L.

DE MELLO (Froliano). **Um caso de oclusão intestinal provocada pela ascaridiose.** [A Case of Intestinal Obstruction due to Ascarides.] —*Bol. Ger. Med. e Farmacia.* Nova-Gôa. 1917. Apr. Vol. 4. No. 4. pp. 144–146.

Notes of the case of a policeman, who was admitted to hospital with symptoms of obstruction of the bowels, coming on after a hearty meal. Treatment with enemata brought away two or three round worms. Upon this indication santonin and calomel were given, followed by a Seidlitz powder. This treatment procured the immediate evacuation of a mass of 40 worms, which was followed by the expulsion of others to the total number of 600, in the course of three days. The symptoms of obstruction were thus completely relieved.

J. B. N.

MASTERS (Walter E.). **Intestinal Obstruction due to** ***Ascaris lumbricoides.***—*Jl. Trop. Med. & Hyg.* 1917. Oct. 1. Vol. 20. No. 19. pp. 226–227.

Clinical details are given of a case of intestinal obstruction of obscure origin in which laparotomy had been decided upon. Meantime however the patient with much retching vomited up a knot of roundworms, four in number. The longest measured 18½ inches. During the night as a result of a purgative a large number of *Ascaris lumbricoides* were passed. Relief was immediate, the pain ceased and in three days the patient was again at work.

R. T. L.

SILER (J. F.) & COLE (C. L.). **The Prevalence of Hookworm Disease in the Fourth Texas Infantry, First Mississippi Infantry and First Alabama Cavalry Regiments.**—*Milit. Surgeon.* 1917. July. Vol. 41. No. 1. pp. 77–99. With 6 charts.

A survey was undertaken to determine the influence of hookworm infections on the excessive morbidity rates prevailing in regiments recruited from the Southern States, as compared with those from the Northern States where hookworm disease does not prevail.

Three regiments, from Texas, Mississippi and Alabama, with an approximate strength of 3,400 men gave the following degrees of infection with hookworm :—The Fourth Texas Infantry 6 per cent. First Mississippi Infantry 32 per cent. First Alabama Cavalry 54 per cent. The hookworm infections occurred more commonly in men from rural districts or small towns than in those from cities. An epidemic of measles in the latter two regiments was studied in relation to possible influence of residence and hookworm disease and it was found that the incidence rate of measles in both regiments was decidedly higher than for the urban group, while men with hookworm disease actually came down with measles with twice the frequency of men free from the disease irrespective of prior residence in urban or rural districts. These individuals moreover developed complications—lobar and bronchopneumonia, bronchitis and otitis media—with greater frequency than individuals free from hookworm infection. A detailed analysis of the statistics is made and these suggest strongly that there is a definite correlation between hookworm disease and greater susceptibility to certain transmissible diseases.

R. T. L.

FOSTER, Jr. (George B.) & SINCLAIR (Charles G.). **Hookworm Infection as a Medico-Military Consideration: Recent Experiences with Southern Troops during Mobilization on the Mexican Border.**—*Jl. Amer. Med. Assoc.* 1917. Aug. 11. Vol. 69. No. 6. pp. 431–434.

In June 1916 about ten thousand troops, chiefly of the National Guard from the northern, eastern and Pacific states were mobilized at Nogales, Arizona, U.S.A. They had very little sickness. The morbidity rates from August to October averaged 17·9 per thousand while that of the 1,200 regulars included in the 10,000 muster was 23·1 per thousand. During the last week of October a brigade of the Alabama National Guard was mobilized at Nogales. Shortly after the arrival of these troops the morbidity rate began to soar. During November acute respiratory infections reached epidemic proportions. In December pneumonia and measles became epidemic and continued until March. There were 140 cases of pneumonia with 29 deaths ; of measles there were several hundred cases confined almost solely to the Alabama troops. The First Alabama Infantry with 963 men had 84 per cent. on sick report for some cause at some period during the four months October to February. In the Fourth Alabama Infantry 859 out of 1,002 men or 85·7 per cent. reported sick during the same period. There were no epidemics in the civil community nor were the morbidity rates for the other troops abnormally high, although they lived under conditions and environment identical with those of the Alabama troops. All were furnished with the same ration, clothing, bedding, shelter, an unimpeachable water supply, a uniform system for the disposal of excreta and wastes and an ideal camp site. Despite all sanitary measures the morbidity rates remained high. It was apparent that factors not common to the other troops determined the high incidence of disease in the Alabama command. Each Alabama soldier was then examined for malaria and hookworm infection. Blood examinations of 236 soldiers admitted to hospital showed plasmodia in only 0·3 per cent. The hookworm survey was applied to 1,259 men ; hookworm infection was detected in 39·9 per cent. The troops in which the incidence of hookworm was greatest came from the low flat river-intersected section of Alabama and it was in these troops likewise that morbidity and mortality was highest.

The authors feel assured that systematic hookworm surveys in all mobilization camps of the Southern States would result in incalculable collateral benefits. They quote the effects produced in the statistics of Bilibid Prison, Manila. The annual death rate from all causes was 234 per 1,000 when the Americans took charge. This was reduced to 75 per 1,000 by general sanitary measures but could not be further reduced. It was then found that many of the prisoners were infected with hookworms. They were freed from their worms by thymol and the annual death rate from all causes fell to 13·5 per thousand.

R. T. L.

STILES (Ch. Wardell). **Certain Military Aspects of Hookworm Disease.** —*Public Health Rep.* 1917. Aug. 17. Vol. 32. No. 33. pp. 1299–1301.

As the result of an examination of a newly-formed militia unit recently mobilized for war service the author concludes that (1) Recruits may be rejected for remediable conditions due to hookworm and allied infections. (2) Anthelmintic treatment would enable provisional acceptance of recruits rejected because of underweight. (3) Failure to treat the hookworm cases and to *eliminate* at least the severe infections of Strongyloides will undoubtedly result in unjust and preventable punishment for offences due to remediable conditions, considerable physical and mental inefficiency, an unnecessarily high daily " sick call " and premature and preventable pensions. (4) If even light cases of infection with hookworms are sent to the trenches in Europe there is danger of causing a widespread epidemic similar to the St. Gothard tunnel epidemic, and of leaving in France and Belgium a widespread infection that will take years of work and large expenditure to control and eradicate after the war. (5) These dangers from inefficiency, sickness, epidemics etc. can be prevented to a very great extent if all the recruits or at least those from certain States are systematically examined for intestinal parasites and either treated or discharged as necessity indicates.

R. T. L

WASHBURN (B. E). **Use of Thymol in Treatment of Hookworm Disease.**—*Jl. Amer. Med. Assoc.* 1917. Apr. 21. Vol. 68. No. 16. pp. 1162–1163.

The relative efficiency of thymol when administered in capsules with varying proportions of *lactose* and *sodium bicarbonate* was tested during an intensive hookworm campaign in Trinidad. 325 patients were treated with pure thymol and 12·6 per cent. only were cured by two treatments. 1,112 patients were treated with finely powdered thymol mixed with equal parts of lactose and 49·1 per cent. were cured by two treatments. It was found however that with this latter method 30 per cent. suffered from unpleasant gastric symptoms varying from a burning sensation and slight gastric pain to nausea and vomiting. Later thymol mixed with equal parts of sodium bicarbonate was tested. Of 136 persons treated twice 51 per cent. were cured and of 154 persons similarly treated 43 per cent. were cured. On these results, he states, sodium bicarbonate mixture is superior to and much less expensive than lactose.

R. T. L.

FERGUSON (J. E. A.). **The Treatment of Anchylostomiasis in the Peter's Hall Medical District.**—*Brit. Guiana Med. Annual.* Twenty-First Year of Issue. 1915. pp. 43–48.

Whereas 63·3 per cent. of the coolies of the Diamond Estates showed infection before systematic treatment for ankylostome infection, the recent survey showed that the index of infection is now only 19·2 per cent. That the estate yards are practically free from larvae as a result of the establishment of an efficient system of latrines some ten years ago and the repeated medicinal treatment is proved by the almost complete absence of ankylostomes in the young children who rarely leave these yards.

The author has experimented with Infusions, Juice and Decoction of the chenopodium plant. The Juice is rather unpleasant but when sweetened with sugar has been found to kill the worms in from two to four weeks; three ounces are given as a dose to adults; it cures in a much shorter time than the Infusion. The Infusion is made from unbruised fresh green leaves, young stems and flower tops, in the proportion of 4 ozs. to the pint, infused for an hour in an earthenware vessel. Five ounces sweetened with sugar makes a not unpleasant aromatic "tea." This dose three times a day, one hour before meals, rids the intestines of all nematode worms in one or two months. No constitutional disturbances are associated with this long treatment and the "tea" is an excellent stomachic and intestinal tonic. It is especially valuable in infections associated with albuminuria, old age, pregnancy, extreme anaemia and debility. As the decoction is without aroma and is less palatable than the infusion its action has not yet been tested.

R. T. L.

i. BARNES (W. S.). **The Use of Quassia in Ankylostomiasis.**—*Brit. Guiana Med. Annual.* Twenty-First Year of Issue. 1915. pp. 96–100.

ii. KENNARD (C. P.). **The Use of Quassia in Ankylostomiasis.**—*Ibid.* pp. 101–107.

The first paper states that the author has used quassia as a vermifuge for 19 months and that the results have been most satisfactory in most cases. Failures are due to faulty infusion or dilution with food or drink. Over one thousand cases have been treated and a cure has never failed.

The second paper gives the experience of the author from a trial with Dr. Barnes's method. He says that "in no case can I say that I have had a cure." Chlorine water was equally inefficient.

R. T. L.

DE FARIA (G.). **Nota sobre *Agchylostoma braziliense* G. de Faria 1910.** —*Mem. Inst. Oswaldo Cruz.* 1916. Vol. 8. No. 2. pp. 71–73.

The author has recently been able to compare his original specimens of *Ancylostoma braziliense* with samples of *A. ceylanicum* collected by Lt.-Col. Clayton LANE in India. He finds that these two species differ chiefly in the formation of the mouth capsule and the caudal bursa. In *A. braziliense* the internal tooth is relatively much smaller than in *A. ceylanicum.* In the bursa the chief difference lies in the relative length and thickness of the externodorsal ray. In *A. braziliense* this is long and slender while in *A. ceylanicum* it is short and stout. These additional differential characters dispose of the suggestion made by LEIPER that these species were apparently identical.

R. T. L.

PORTO-CARRERO (J.). **Ankylostomose na Marinha Nacional.** [Ankylostomiasis in the National Navy of Brazil.]—*Brazil Medico.* 1917. Aug. 11 & 18. Vol. 31. Nos. 32, 33. pp. 271–272, 279–281.

A paper contradicting a sensational article, which appeared in a non-medical Brazilian journal, to the effect that half the men in the Brazilian Navy were suffering from ankylostomiasis. The author supplies figures to show that this statement is an absurd exaggeration. Out of a total strength of 6,511 men in port, 214 or 3·2 per cent., were found infected with ankylostomiasis, in the year 1916. The author goes on to point out that the general use of sea-water on board ship for all washing purposes, and the provision of filtered water for drinking, make it unlikely that there should be much infection amongst sailors with (the ova of) worms of any species. It appears that the alarming figures quoted were derived from a report of the medical examination of certain conscripts, who mostly came from the interior of Brazil. The subject seems to be one of merely local interest.

J. B. N.

DE ANDRADE (Astor Dias) **Dystrophias [infantis na ancylostomose.** [Arrest of Development in Children suffering from Ankylostomiasis.]—*Ann. Paulist. Med. e Cirurg.* 1916. Dec. Year 4. Vol. 7. No. 6. pp. 133–141. With 5 figs.

A short paper drawing attention to the arrest of development often to be seen in young children suffering from ankylostomiasis, and not apparently attributable to any other cause. Six cases are described in illustration. Not having had the opportunity of making an autopsy in any fatal case, the author is unable to speak with confidence as to the intimate pathology of the condition, but is disposed to attribute it to defects in endocrinal secretion.

J. B. N.

HUME (Edward H.). **Hookworm Control in South China. Based on a Preliminary Study of the Incidence of Hookworm Infection in Hunan Province, China.**—*Jl. Amer. Med. Assoc.* 1917. June 23. Vol. 68. No. 25. pp. 1888–1892.

The control of hookworm in China is complicated by the universal use of human excrement as a fertilizer, the presence of other diseases like schistosomiasis with similar symptomatology, and the concurrence of malaria and other fevers which render it difficult to evaluate the exact morbid significance of each. A preliminary survey in Hunan showed a hookworm incidence of 11·66 per cent. in Changsha, 15·29 per cent. in Changteh, 81·62 per cent. in Pinghsiang and 12·86 per cent. in Sinhwa. The great disparity of the Pinghsiang cases was due to the fact that the bulk of the cases were among underground workers in a deep mine with ideal conditions of moisture, humidity and lack of sanitation. Next to miners the farmers are among the most heavily infected. The mining forces are recruited mainly from the agricultural workers. As it is both financially profitable to market night-soil and agriculturally indispensable to use it for fertilisation in a land where horses and cattle are few, the solution of the hookworm problem lies in the discovery of a practical method of treating human excrement without destroying its fertilising value.

R. T. L.

MACFIE (J. W. Scott). **Arneth Counts in Ankylostomiasis and other Pathological Conditions.**—*Report of the Accra Laboratory for the Year 1916.* pp. 43–53. With 2 charts. 1917. London: J. & A. Churchill.

In malaria and in yellow fever there is a shift to the left of the Arneth count. In ankylostomiasis KNAPP has shown that a shift to the right may take place but he considered his results on the whole equivocal. The author examined the Arneth count of twenty-three inmates of Accra Asylum in whose faeces hookworm ova had been found. In six of these malaria parasites, *P. falciparum*, occurred. "All these cases showed a well-marked shift to the left of the Arneth count, the index varying from 63·0 to 89·0 averaging 75·8. It was evident, therefore, that any shift to the right there might be in ankylostomiasis was not sufficient to mask the shift to the left that accompanies a malarial infection." Of the remainder, although no malarial parasites were found, it was probable that some had recently had malaria. The Arneth count in these cases varied from 69·0 to 23·0, an average index of 47·0 as compared with an average index of 55·9 found in twenty apparently healthy natives in Accra. The author deduced from his figures that " there appeared unquestionably to be a tendency to develop a shift to the right in the patients infected with hookworms."

R. T. L.

LEGER (Marcel). **Résistance globulaire dans l'ankylostomiase.**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 177–180.

The globular resistance of the blood in ankylostomiasis has so far only been determined in a single case : by DARRÉ in 1909.

From a study of the blood conditions in eight patients infected with *Necator americanus* the author arrives at exactly opposite conclusions from those of DARRÉ. No relation has been found to exist between the increase of the globular resistance and the diminution in the percentage of haemoglobin or the number of red cells. Nor is there any association with the degree of eosinophilia. Ankylostomiasis then is characterised, as a whole, by an increase in the globular resistance ; the haemolysis curve is not only retarded but is greatly prolonged. The hyperresistance recalls that recorded by MAY (1913) following repeated abstraction of blood. DARRÉ's results are probably attributable to an attack of biliary haemoglobinuric fever which is mentioned in the previous history of his case.

R. T. L.

DA MATTA (Alfredo A.). **Entero-trichocephalose.** [A Fatal Case of Trichocephaliasis of the Intestine.]—*Brazil Medico.* 1917. Apr. 28. Vol. 31. No. 17. pp. 141–143. With 1 text-fig.

The case of a child, aged four years, taken into hospital for symptoms of advanced anaemia and dropsy. The stools were frequent, loose and streaked with blood, and contained numerous Trichocephalus ova. Marked eosinophilia was present (14·3 per cent.). The child died after being in hospital for rather more than two months, every kind of treatment being unavailing. Post-mortem, large numbers of trichocephali were found adhering to the mucous membrane of the lower portion of the ileum, the caecum and the large intestine, as shown in a photograph. The mucous membrane itself was congested and ecchymosed. Out of a total of 123 worms counted, 52, or 42 per cent., were males.

J. B. N.

SUZUKI (K.). [**Relation of *Trichuris trichuria* to Appendicitis.**]—*Tokyo Igakukai Zasshi.* (*Mitteil. d. Gesellsch. z. Tokio*). 1916. Dec. 20. Vol. 30. No. 24. pp. 1–18. With 4 photographs.

[Abstract from Review by R. G. MILLS.]

In 2,415 Marines eggs of Trichuris were found in 49·15 per cent. and of Oxyuris in only 0·21 per cent. Details are given of a case operated upon for appendicitis. Trichuris was found in the lumen and wall of the appendix together with faecal masses and various bacteria. It was impossible to incriminate the parasite definitely as the primary cause, although there was a catarrhal condition of the organ.

R. T. L.

YORKE (Warrington) & BLACKLOCK (B.). **Observations on the Periodicity of *Microfilaria nocturna*.**—*Ann. Trop. Med. & Parasit.* 1917. Aug. 23. Vol. 11. No. 2. pp. 127–149. With 1 coloured plate & 4 charts.

The observations recorded in this paper were made upon an Australian aged 19 years who had since July 1915 suffered periodically from pain in the back accompanied by the passage of clots and of urine resembling milk tinged with blood. A diagnosis of filariasis was made from the finding of microfilariae in the urinary deposit. Blood-films made during the day were practically negative but those made at night contained larval *Filaria bancrofti* in considerable numbers. A series of films was made from the cutaneous blood and from the median basilic vein. The number of larvae occurring at any time in a given quantity of blood is much greater in the cutaneous than in the venous blood. There is a definite periodicity in both and the time of greatest concentration of larvae coincide. The nocturnal periodicity of *M. nocturna* is thought to depend primarily upon periodic variations in the arterial supply of larvae to the cutaneous vessels. The obstruction to the passage of the larvae through the cutaneous vessels plays no essential part in the periodicity. Reversal of the hours of sleep and activity brings about a gradual change in the incidence of the periodicity. After four days the maximum concentration was set back only six hours, after eleven days nocturnal had become completely diurnal periodicity. There is a regular periodicity in the concentration of larvae in the urinary blood which is, however, at its maximum several hours later than that in the cutaneous blood. The majority of the larvae escape into the urine with the blood. [A series of useful charts and a superbly coloured plate illustrate the paper.]

R. T. L.

BREINL (A.) & PRIESTLEY (H.). **Two Unusual Cases of Filariasis observed in North Queensland.**—*Jl. Trop. Med. & Hyg.* 1917. Nov. 15. Vol. 20. No. 22. pp. 253–254.

Filariasis is common in North Queensland and the clinical appearances conform with those seen in other parts of the tropics. The authors record two cases of exceptional interest. A girl, 26 years old, had noticed "during the last four years a swelling in her right groin which decreased in size during a night's rest but became more marked after a day's exertion. She had noticed for some time a few water blisters in the skin of the left side of the lower abdomen. These were *easily ruptured by slight rubbing and then discharged a large quantity* of pinkish milky fluid. The oozing continued for hours and even days." Examination of the peripheral blood by day was negative. At night *Microfilaria bancrofti* were found in numbers. "An oval area of skin about 6 by 4 cm., containing the vesicles with the underlying subcutaneous tissue down to the fascia over the external oblique muscle was removed. The adipose tissue contained a rich branching meshwork of large lymphatic vessels and a few seconds after the incision the wound filled with chylous fluid." Microscopical examination of the removed tissues showed throughout the subcutaneous tissue a rich network of hypertrophic lymph vessels, forming here and there dilatations and diverticula filled with coagulated lymph. The vesicles, which communicated with the dilated vessels, were intracutaneous and were covered by a layer of epidermis only, thus explaining how the least injury to a vesicle led to a copious leakage of lymph.

The second case was that of a very well-nourished man of about 47 years of age admitted to hospital and was diagnosed as " acute peritonitis " ; the patient's condition did not allow of surgical interference and death supervened ten hours later. At the post-mortem it was found that " the right groin and Scarpa's triangle were the seat of an extensive soft swelling." " The abdominal cavity contained about one pint of pinkish chylous fluid containing numerous small flakes of fibrin." An irregular, ill-defined, flesh-coloured mass of soft tissue consisting of numerous cysts varying in size from 3mm. to 4 cm. in diameter, embedded in oedematous connective tissue, extended below the anterior border of the liver and was connected with a similar mass extending retroperitoneally over the posterior abdominal wall. Thus the whole of the lymphatic system of the retroperitoneal space had become involved in hypertrophy and hyperplasia. The mass consisted partly of distended and cystic degenerated lymphatics and oedematous connective tissue and concealed both kidneys and pancreas. No ruptured wall of the lymphatic varix could be detected but the acute peritoneal irritation and collapse were apparently due to the rupture of the lymphatic varix and the effusion of chylous fluid into the peritoneal cavity. No other pathological lesion was found. A detailed note of the microscopical appearances of the lymphatic varix is given.

R. T. L.

Rose (F. G.). **"Filarial" Lymphangitis and its Treatment by Vaccines.** —*Brit. Guiana Med. Annual.* Twenty-First Year of Issue. 1915. pp. 7–11.

In countries where the population is infected with *Filaria bancrofti* a condition of acute and oft-recurring lymphangitis is a frequent accompaniment of the filarial infection. Shortly after the outbreak of war a number of would-be recruits were admitted to hospital for the removal of enlarged glands considered to be of filarial origin. Some of these had a history of previous lymphangitic attacks. The author obtained from five of these cases glands in which adult filariae were present. The gland juice proved to be sterile but a streptococcus was found by staining a large number of sections. By using Wright's medium (containing Peptone 1 per cent., Lemco 1 per cent., Human Serum 5 per cent., Glucose 1 per cent. and an amount of alkali fixed by neutralizing to phenol-phthalein and adding 6 cc. of normal acid to each litre of medium) streptococci were recovered in pure culture from fifteen out of seventeen cases of filarial lymphangitis of the leg.

These were simple cases varying from transient redness and tenderness to severe pain with swelling and oedema.

A vaccine was prepared from eight of the most typical strains and was used in ten cases, one of filarial orchitis, one of filarial synovitis of the knee and the others filarial lymphangitis. None showed recurrences and all settled down in a few days after the first injection. A case of filarial septicaemia failed to improve and eventually died.

R. T. L.

Skrjabin (K. I.). *Loa extraocularis* **nov. sp., parasite nouveau de l'œil de l'homme.**—*C. R. Soc. Biol.* 1917. July 28. Vol. 80. No. 15. pp. 759–762. With 3 text-figs.

A female filarial worm 143 mm. in length, was removed by Dr. A. P. Wladytchensky of Ekatérinodare, North Caucasus, from a tumour in the orbital cavity of a peasant 20 years of age. The tumour was about the size of a haricot bean and lay in the inner angle of the eye between the orbital wall and the eyeball. It was moveable, painless, tense and not adherent to the surrounding tissues. The movement of the eyeball was not affected. The tumour was removed and found to contain within a fibrous capsule a delicate actively moving worm.

The parasite resembles at first glance *Filaria conjunctivae* Addario 1885 but differs especially in the structure of the vulva and of the nerve ring and the character of the tail. From *Loa loa* it can readily be distinguished by (1) length, (2) absence of cuticular papillae. With it the following characteristics are shared : (1) the number and disposition of the *buccal* papillae are identical, (2) the vulva is similarly situated behind the junction of oesophagus and gut, (3) there are two post-anal [caudal] papillae in the female, (4) the general topography of the female genital tubes coincides, (5) the anterior end is much thicker than the posterior. On these grounds the author includes the new parasite as a second species in the genus *Loa.* The worm is immature, containing neither eggs nor embryoes. The greatest breadth of the body is 0·612 mm.—just behind the vulva. The cuticle is finely striated transversely. The oesophagus measures 0·935 mm. by 0·085 mm. The nerve ring is 0·272 mm. from the anterior extremity. The anus is only 0·1 mm. from the posterior end. The vulva opens 2·04 mm. from the anterior extremity.

R. T. L.

Dubois (A.). *Onchocerca volvulus* **et l'Eléphantiasis dans le Haut-Ouellé (Congo Belge).**—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 365–371.

The author had previously reported on the distribution of *O. volvulus* in Bas-Ouellé and on the relation of this filaria to elephantiasis [see this *Bulletin,* Vol. 8, p. 201]. Recently he had an opportunity of visiting Haut-Ouellé (Uele in Belgian maps) and of collecting further information which confirms, generally, the results of Ouzilleau. Of new cases of genital elephantiasis 48 were met with; 43 of these had parasitic nodules and four were diagnosed as infected with *O. volvulus* after puncture of the inguinal glands. In one only were there no nodules and four gland punctures were negative. Elephantiasis of the foot was seen in four other cases in which parasitic cysts were also present. The two series give a combined total of 105 cases of elephantiasis (three of the vulva, eight of the lower limbs, 94 of the scrotum and penis).

The geographical coincidence of this filarial worm and elephantiasis is very striking. In the Amadi-Suronga region 398 out of 571 adults i.e., 68 per cent., and of 152 children 22 per cent. were subject to parasitic nodule; fifty cases of elephantiasis were seen. Around Niangera *O. volvulus* is still frequent and this prevalence continues as far as Dungu; elephantiasis is common in this district. From Dungu to Faradje and Aba the volvulus cases appeared to diminish in number.

Keratodermia was commonly seen in the onchocerciasis zone. Juxta-articular nodosities were very rare.

The author concludes that among the riverine population of the Ouellé-Bomou basin a form of elephantiasis is associated with infection with *Filaria volvulus* and is not to be confused with that resulting from *F. bancrofti.*

R. T. L.

GUPTA (Jai Jai Ram). **Guinea Worm and Iodine.** [Correspondence.] —*Indian Med. Gaz.* 1917. Nov. Vol. 52. No. 11. p. 419.

Fifty cases of guineaworm have been successfully treated by the injection of tincture of iodine into the abscess. In the majority of cases cure has resulted in two days from a single injection of three grains [*sic*]. Where there is much pus the abscess is freely incised, irrigated with iodine lotion and the cavity wall painted with tincture of iodine. Iodine dressings are used. The author believes that the iodine injection has a prophylactic action as worm abscesses are subsequently rare "although the general belief is that one must get seven abscesses before the poison dies out."

R. T. L.

JANICKI (Constantin). **Experimentelle Untersuchungen zur Entwickelung von *Dibothriocephalus latus* L. I. Ueber negative Versuche, junge Forellen, Hechte und Barsche direkt mit Flimmerembryonen zu infizieren.** [Experiments on the Development of *D. l.* (I) Failure to infect Young Trout, Pike and Perch with Ciliated Embryoes.] —*Cent. f. Bakt.* 1. Abt. Orig. 1917. July 31. Vol. 79. No. 7. pp. 443–461.

Bothriocephalus eggs from human faeces give rise to swimming embryos in from thirteen days to five weeks at summer temperature. Attempts, of which details are given in the paper, were made to infect over 100 examples of trout under three months old but proved negative. Similarly 70 pike under two months were unsuccessfully submitted to infection. Daphnids were also found immune. A smaller series of experiments were made on the perch and burbot. The author concludes that an intermediary host not yet found is an essential preliminary and that the fish acts as only the *second* intermediate host in the life cycle of *D. latus.*

R. T. L.

LEVY (M. D.) & WALL (Dick P.). *Bothriocephalus latus* **Infection—Report of a Case.**—*Southern Med. Jl.* 1917. July. Vol. 10. No. 7. pp. 546–547.

In reporting a case of Bothriocephalus in 1916 SINGER was able to collect only thirty other records in American literature [see this *Bulletin*, Vol. 8, p. 192] The present case presents no unusual features but is deemed worthy of a place in the literature of the subject. The infection is said to be fairly common among the Finns of the North Western States and the present case is a Finn who had been in the United States for five years. For four years he had passed segments of tapeworm; sometimes the portions of strobila measured as much as fifteen feet in length. Large numbers of Bothriocephalus eggs were found in the stool. There was an entire lack of subjective symptoms. Blood examination gave 3,240,000 red corpuscles, 90 per cent. haemoglobin, colour index 1·4x per cent.; differential count gave only 2 per cent. eosinophilia. Treatment with ethereal extract of male fern removed two large Bothriocephalus worms, each twenty-four feet long. The stools were subsequently free from ova.

R. T. L.

YOSHIDA (Sadao). **The Occurrence of** *Bothriocephalus liguloides* **Leuckart, with Especial Reference to its Development.**—*Jl. Parasit.* 1917. June. Vol. 3. No. 4. pp. 171–176. With 1 fig.

About fifty-five cases of *Ligula mansoni* (*Bothriocephalus liguloides*) have been recorded since MANSON found the first specimen in 1882. The author accidentally came across thirty-six specimens of this larval cestode in the body cavity and body wall of a cat which died in an extremely undernourished condition. The fresh specimens were extremely mobile and measured up to 75 cm. in length. These were fed to two young cats which unfortunately died five days later from some unknown cause and no parasite was found in the alimentary canal on dissection. Later another specimen was obtained from the abdominal wall of a patient and was fed to a laboratory bred dog 27 days old. After two months a large Dibothriocephalus measuring 2·5 metres in length and 12 mm. in maximum breadth was recovered. The eggs differ markedly from those of *D. latus* but in this character only can the worm be positively distinguished. The author thinks it probable that the dog harbours two species of adult Bothriocephalus worms; one the wellknown *D. latus* from the eating of salmon-trout, the other the adult form of MANSON's liguloid larva.

R. T. L.

KOTHARY (P. T.). **Hydatid Disease in Kathiawar.**—*Indian Med. Gaz.* 1917. Aug. Vol. 52. No. 8. pp. 273–275.

Hydatid has only been recorded three times during the past seven years in the Rajkot Hospital, India. Notes of these cases are now given. The first was in a woman aged 30. The tumour, which was the size of a coconut, lay on the back below the scapula. It was movable but the overlying skin was adherent. The cyst was believed to be sebaceous but on incision was found to contain daughter cysts

The other cases were suppurating hydatid of the liver with fever and were diagnosed as abscess of the liver. The true nature of the lesion was discovered at operation.

R. T. L.

INGRAM (A.). **An Examination of the Inmates of the Accra Asylum for Parasitic Infections.**—*Report of the Accra Laboratory for the Year 1916.* pp. 87–89. 1917. London: J. & A. Churchill.

The faeces of 106 persons, the inmates of the Accra Asylum during September and October 1916, were examined. A single preparation of faeces from each individual was made. Oxyuris ova were found once; Hookworm ova 36 times (33·9 per cent.); *Ascaris lumbricoides* ova 68 (i.e., 64·1 per cent.) times; *Trichuris trichiura* ova 34 times (32 per cent.); *Taenia saginata* ova 10 times (9·4 per cent.); *Strongyloides stercoralis* 14 times (13·2 per cent.). No parasites or eggs were found in the urine. In the "night" blood of 61 of the inmates of the Asylum sheathed microfilariae (*M. bancrofti* ?) were found in seven cases, unsheathed blunt-tailed embryos (*M. perstans*) in three cases, once in association with *M. bancrofti*. The "day" blood of the same persons showed microfilariae only in a single instance. These were both sheathed and unsheathed embryos and were presumed to be *M. loa* and *M. perstans* as the sheathed forms did not occur in the blood at night.

R. T. L.

COMMES (Ch.). **L'eau du Niger et l'helminthiase intestinale.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 730–731.

The natives of Bamako, Upper Senegal, are commonly infected with intestinal helminths. The Europeans there are likewise affected though this is frequently overlooked. The drinking water, taken from the Niger, is the particular source of these infections. The authors have periodically examined the deposit resulting from the addition of alum to ten litres of river water and have found microscopically, after centrifugation, the eggs of Trichocephalus, Ascaris and Ankylostomes. The Trichocephalus eggs occur in greatest abundance in the dry season, those of Ascaris during the winter months. The Ankylostome eggs are about as numerous in the one season as in the other.

R. T. L.

CLAPIER (N.). **Notes sur le parasitisme intestinal par les Nématodes dans la zone frontière du Liberia et de la Guinée.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 560–563.

The Franco-Liberia Boundary Commission, 1914–1916, examined the stools of 154 children, of ages ranging from five to fifteen, attending various centres in the military region of French Guinea or in widely scattered villages on the Liberian frontier (ranging from between 10·30° to 13° W. and 7·15° to 9° N.). The observations were made during the dry season, i.e., from October to March. Ankylostomes were detected in 116 cases, i.e., 75.3 per cent., *Ascaris lumbricoides* in 57, i.e., 37 per cent. and Trichocephalus in 54, i.e., 35 per cent.

Strongyloides occurred in at least ten cases and in one instance the larvae were in very large numbers. The patient had severe diarrhoea with bloody stools; the symptoms and he larvae disappeared after some days as a result of the administration of a mixture of thymol and calomel. The author states that *A. duodenale* [?] was found in large numbers in the intestine of a cachectic cat. Both *A. duodenale* and *N. americanus* occurred in the human cases; the latter was verified by finding the adults, the former was inferred from the finding of two eggs of different length in the stools.

Of 11 Europeans who had lived in the district for more than one year only three were infected and these harboured Trichocephalus only.

R. T. L.

LEGER (Marcel). **Parasitisme intestinal à la Guyane française dans la population locale et dans l'élément pénal.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 557–560.

Advantage was taken of the recent mobilisation of young recruits in Cayenne for service in France to ascertain the degree of helminthic infection among the indigenous population. The stools of 242 soldiers of from 18 to 34 years of age were examined and 82·7 per cent. were found to be carriers of helminths. Ankylostomes occurred in 62 per cent., Trichocephalus in 41 per cent. and Ascaris in 38 per cent. The degree of infestation with *Schistosomum mansoni* has been the subject of a recent note by the author [see this *Bulletin*, Vol. 10, p. 115]. It is noted that in accordance with the wise instructions of the Under Secretary of State of the Health Ministry the hookworm carriers had to be systematically treated before they left the Colony.

Among the convicts BRIMONT in 1909 had noted a hookworm infection of 69 per cent. and BLIN recorded 74 per cent. as carriers. The author found 253 carriers of helminths in 266 individuals, i.e., 95 per cent. Ankylostomes occurred in 92·5 per cent., Trichocephalus in 30 per cent. and Ascaris in 17 per cent. In two cases there were Oxyuris and in two others were *Schistosomum mansoni.* An egg not yet definitely diagnosed was seen in three cases.

Ascaris carriers are uniformly distributed throughout the three French colonies in America. In Guadeloupe Trichocephalus is common while Ankylostomes are of like frequency in Guadeloupe and French Guiana and uncommon in Martinique.

R. T. L.

GARCIA (Faustino). **Common Intestinal Parasites.**—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. Jan. Vol. 12. No. 1. pp. 25–32.

From the records of the stool examinations made at the Southern Islands Hospital between April 1913 and November 1916 the author has obtained statistical information as to the prevalence of infections by intestinal parasites among the Filipinos of the Vesayan Islands of the Philippines. 1,603 patients were investigated, 66·5 per cent. were infected. In 41 per cent. there was Trichuris infection alone; in 31 per cent. hookworm infection alone; in 27 per cent. Ascaris infection alone. Strongyloides was noted seven times, Taenia six and *Hymenolepis nana* once. The symptoms of intestinal infections are indefinite among the Filipinos and it would seem that these people are not as susceptible to intoxication from hookworm as the white race.

Ascaris infection is greater in the city of Cebu than in the towns of the Cebu province but in hookworm the incidence is the reverse.

R. T. L.

BOWMAN (F. B.) & SAYLOR (P. D.). **Report on Examinations of Faeces of Chinese Labourers.**—*Lancet.* 1917. Nov. 24. pp. 791–792.

From an examination of 340 specimens of faeces from Northern Chinese labourers it was found that parasitic infections occurred in the following percentages: *Ascaris lumbricoides* 88 per cent. (225 infected), *Ankylostoma duodenale* 11 per cent. (38 infected), *Oxyuris vermicularis* 2 per cent. (7 infected), *Strongyloides stercoralis* 1 per cent. (3 infected) and *Trichuris trichiura* 4 per cent. (15 infected). Only one preparation was made and examined unless the first was entirely unsatisfactory. The sputum of several cases showed a considerable amount of blood but gave a negative result as regards Paragonimus ova. From the above the authors conclude that "Hookworm infection is very prevalent and calls for attention."

"The winter and early spring are the seasons when pneumonia, measles &c. appear, and the possibility of these diseases appearing among the Chinese is not remote. Hookworm infection should be taken into account as a devitalising agent, and thus a predisposing factor in the seriousness of these conditions."

R. T. L.

BARDACHZI (Franz) & BARABÁS (Zoltán). **Auffallend häufiges Vorkommen von Eingeweidewürmern bei Kriegsteilnehmern.** [Remarkable Percentages of Worm Occurrence in Soldiers.]—*Münch. Med. Woch.* 1917. Apr. 24. Vol. 64. No. 17. pp. 570–572.

A study of the stools of 526 persons (403 soldiers and 123 civilians) in Eastern Galicia showed that 46·6 per cent. were infected with Trichocephalus, 33·6 per cent. with Ascaris, 2 3 per cent. with Oxyuris. The results lead the author to the conclusion that systematic microscopical examination of the faeces is advisable and may reveal a simple explanation for many cases of obscure anaemia, indigestion, debility and exhaustion, and others showing nervous symptoms.

R. T. L.

FRICKE (Winfried). **Vergleichende Wurmeier-Untersuchungen in Mazedonien.** [Comparative Investigations on Helminth Eggs in Macedonia.]—*Deut. Med. Woch.* 1917. July 5. Vol. 43. No. 27. pp. 845–847.

From an examination of 500 stools from Macedonian, Bulgarian, Macedonian-Turk soldiers and natives of Albania and Macedonia the author finds 53 per cent. infected with helminths. The species found was *Ascaris lumbricoides*, *Trichuris trichiura*, *Oxyuris vermicularis*, *Taenia solium* and *Hymenolepis nana*. A series of statistical tables show the relative frequency of these eggs in the stool when sought for by different methods.

R. T. L.

MATSUOKA (Yeisaku). **On the Pathology of Worm Infection of the Vermiform Appendix.**—*Jl. Path. & Bact.* 1917. Apr. Vol. 21. No. 2. pp. 221–247. With 5 plates.

From a study of 103 appendices removed by operation at Freiburg in Breisgau and 23 obtained post-mortem in Edinburgh the author concludes that in these cases worms were "neither directly nor indirectly the cause of acute or of old appendicitis. This conclusion applies equally to adults and children." Oxyuris was found in 3 out of 33 recently inflamed appendices which had been operated on in Freiburg for acute appendicitis and in 26 out of 70 normal or slightly inflamed appendices. Of these 26 only one was abnormal being a case of old appendicitis. Only two appendices contained Trichocephalus and of these one only was inflamed. In the Edinburgh series none of the appendices with Oxyuris and Trichocephalus showed inflammation. In 45 cases which were unnecessarily operated upon 25 contained worms and in the operation cases of another clinic this percentage was found to be 91·7 per cent. In these cases with worms the appendices showed no inflammatory changes but clinical symptoms resembling appendicitis nevertheless occurred. In this disease—called pseudo-appendicitis zooparasitaria—pathognomonic symptoms do not occur but there are characteristic signs, viz., "absence of fever (occasionally very slight fever), faint sensibility to pressure, and spontaneous subjective sensation of pain in the ileo-caecal region, with the presence of worms or eggs in the faeces."

In the appendix the author differentiates true worm canals, smooth walled spaces formed by the movement of the worm through the mucosa, and RHEINDORF's worm canals which are artificial fissures and may be avoided by embedding in celloidin for section cutting. Oxyuris is fairly common, Trichocephalus rare in the appendix: sometimes single specimens occur and may be overlooked.

R. T L.

HALL (Maurice C.) & FOSTER (Winthrop D.). **Oil of Chenopodium and Chloroform as Anthelmintics. Preliminary Note.**—*Jl. Amer. Med. Assoc.* 1917. June 30. Vol. 68. No. 26. pp. 1961–1963.

From experiments upon dogs the authors find that oil of chenopodium should be administered with large doses of castor oil and that when so given it is an uncommonly effective and quite safe anthelmintic against ascarids. It is considered inadvisable to allow chenopodium oil to lie for hours in the digestive tract or to delay the use of castor oil. In the divided doses as usually prescribed the chenopodium is probably absorbed. On the other hand these divided doses aid in protecting the patient by allowing the development of idiosyncratic intolerance and a consequent cessation of the treatment.

Chloroform has been found decidedly superior to thymol or oil of chenopodium as an anthelmintic against hookworms. It is considered as safe as thymol or other effective anthelmintic in these cases. An anthelmintic dose of chloroform of 2 to 3 cc. [for dogs] should not be repeated within three weeks. There are certain lesions of the liver, kidneys and heart in which the use of chloroform would be contra-indicated.

The combination of chenopodium and chloroform does not apparently enhance the anthelmintic value of chloroform but the chenopodium will assist in removing the ascarids that usually are present in hookworm infections in dogs. R. T. L.

HEISER (Victor G.). **The Administration of Chenopodium.**—*Milit. Surgeon* 1917 Aug Vol. 41. No. 2. pp 253–254.

Recent investigations have shown conclusively that chenopodium oil is a most effective remedy for ankylostome and ascaris infections. It has also been successfully administered for tapeworms and for "encysted" amoebic dysentery. It is regarded by many as more pleasant to take than thymol.

A number of deaths following upon its administration have however recently been reported from Ceylon and Mississippi and one from Panama. Numerous reports of deafness extending over a period of months and other untoward symptoms have been received from the West Indies, Federated Malay States and Korea. On the other hand in Sumatra the oil has been given over 300,000 times without any untoward occurrence or symptom. The method of administration in Sumatra differs from that elsewhere in that there are no dietary restrictions; no preliminary purgative; castor oil is used instead of magnesium sulphate and the capsules are only filled just prior to use.

DARLING and BARBER have recently drawn attention to the danger of cumulative effects from chenopodium and advise that treatment be not repeated under ten days. SALANT notes that when the oil is administered to animals at a time when hunger contractions of the stomach are taking place poisoning will result from much smaller doses; moreover castor oil acts like any oil as a neutralizant. Clinical details are given of two fatal cases in Ceylon. R. T. L.

LEIPER (R. T.). **Two Helminthological Notes.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. July. Vol. 10. No. 8. pp. 194–196. With 2 text-figs.

Note on the Integument of the Bilharzia Miracidium.—Specimens fixed by Dr. Ashworth in corrosive sublimate and stained with haematoxylin several years ago now "give a beautiful picture of the skeletal thickenings of cuticle supporting the integument." The two illustrations show this.

A Simple Method for the Preservation of Helminth Ova in Faeces.—Two methods in fact are given:—

"Alcohol, 70 per cent., with 5 per cent. glycerine added, is raised to boiling point. Fluid faeces—or faeces made fluid by dilution with normal saline—are poured into the boiling alcohol, stirred, and then set aside to inspissate in a warm place. When the faeces have become a sticky mass, sufficient pure glycerine is added to make a soft paste."

And: "To any quantity—say, half an ounce—of fluid faeces an equal bulk of Langeron's Lactophenol is added. The whole is intimately mixed by vigorous shaking. This mixture will form a pasty jelly, and will keep indefinitely. A permanent microscopical preparation can be made at any time by stirring a small portion into a drop of glycerine and ringed with melted glycerine jelly, a cover-glass is placed on the jelly, and when this is set the preparation is completed by sealing with goldsize. Langeron's Lactophenol consists of carbolic acid one part, lactic acid one part, glycerine two parts, and water one part. The faeces used should be of a creamy consistence. If solid they should be diluted with normal saline."

A. G. B.

Hookworm Campaigns (1916).*

Active measures for the control and prevention of hookworm infections were in actual operation throughout 1916 in the following tropical and subtropical regions† :—Antigua, Grenada, St. Lucia, St. Vincent, Trinidad, British Guiana, Dutch Guiana, Costa Rica, Guatemala, Nicaragua, Panama, Salvador and Ceylon, under the auspices of the International Health Board. In Brazil, Barbados, British Honduras, Siam, Malaya, Java, China and Fiji, preliminary surveys were made as a basis for future work. As no reference is to be found to the campaign in Egypt this would appear to have been suspended. In India a pioneer campaign in the tea estates of Assam was successfully carried out under the independent auspices of the Indian Research Fund Association.

Antigua (1916).‡

The intensive plan of campaign was in operation during the year firstly under the direction of Dr. H. L. Kearney and latterly under Dr. Don. M. Griswold. By December 31st, 1916, the work which commenced in September 1915 had been completed in the districts, York Valley, Belvidere and All Saints. The following table covers this period of fifteen months.

	York Valley	Belvidere.	All Saints.	Total.§
1. Census	1,957	884	4,724	7,565
2. Examined	1,943	860	4,674	7,477
3. Found infected ..	531	254	1,444	2,229
4. Given first treatment	471	241	1,342	2,054
5. Cured..	450	219	1,304	1,973
Percentage infected cured	84·7%	86·2%	90·3%	88·5%
Percentage of treated cured	95·5%	90·9%	97·2%	96·1%
6. Removed from Area (or dead)	27	7	33	97
7. Remaining in Area uncured	54 (10·2%)	28 (11·0%)	107 (7·4%)	189 (8·5%)
(a) Not located ..	—	3	11	14
(b) Refused ..	10	4	10	24
(c) Medical reasons	36	21	86	143
(d) Under treatment	8	—	—	8

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* For 1914 see this *Bulletin*, Vol. 8, pp. 525–535; for 1915, Vol. 9, pp. 281–292.

† Rockefeller Foundation. International Health Board. Third Annual Report. Publication No. 6. Jan. 1, 1916–Dec. 31, 1916. [Dr. Wickliffe Rose, Director-General.] 1917. New York: 61, Broadway.

‡ *Loc. cit.* pp. 54–61.

§ As in the previous years the statistical tables are composite and are based by the reviewer on two or more tables given in the original report.

Of the total population of the districts no less than 98·8 per cent. were examined; 29·8 per cent. of these were found to be infected. First treatment was administered to 92·1 per cent. of those infected and of these 96·1 per cent. were cured. Only 1 per cent. refused to be cured and only 8·5 per cent. remained as possible foci of infection when the campaign closed.

The native rural population of Antigua is almost entirely without latrine accommodation. Of 1,830 homes in the three areas dealt with only 38 were found provided with latrines. By the end of the year latrines were installed in 32 additional homes. Eighty-five per cent. of the people of the island, excluding St. Johns, are full-blooded negroes, who live mainly in rural villages and engage in agriculture. Sugar is the chief crop. The island was divided into six districts and of these the three dealt with during 1916 cover the southern portion of the island where the population is most dense.

British Guiana (1916).*

In September 1916 operations begun in the Plaisance area in October 1915 were brought to completion. Those begun in another area will be dealt with in the succeeding report. The Plaisance area extends eastwards along the northern coast for twelve miles from Georgetown. It varies in width from one to three miles. The land is flat and lies several feet below sea-level at high-tide, being protected by dykes Drainage is effected by a series of canals which escape through the sea-wall and discharge at low tide. These prove inadequate at times and large areas are flooded. The area is devoted in part to rice-culture.

		Plaisance Area.
1.	Census	18,951
2	Examined	18,498
3.	Found infected	9,808
4.	Given first treatment	8,263
5.	Cured	6,225
	Percentage of infected cured 63·5%	—
	Percentage of treated cured ..	—
6.	Removed from Area (or dead)	1,461
7.	Remaining in Area uncured	2,122
	(a) Refused 633	(21·6%)
	(b) Medical Reasons .. 587	—
	(c) Under treatment .. 902	—

At the close of the campaign the number of persons remaining as foci of infection was 21·6 per cent. of those infected.

As compared with the districts of Peter's Hall and Belle Vue previously treated the percentage of persons cured in the Plaisance

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**Loc. cit.* pp. 62–74.

Area is smaller. This is explained by the fact that the East Indians are busily engaged in rice-growing and as a rule will not give even one day for treatment during the planting and harvesting seasons, which occupy four or five months of the year.

Sanitary Improvement.—During 1916 4,900 homes were inspected; 2,409 (49·2 per cent.) were found already provided with latrines. At the close of the campaign only 55 additional latrines had been installed. The villagers objected to the enforcement of sanitary laws and refused to take further treatment unless the inspectors were withdrawn. This was done but steps are now being taken to enforce the sanitary regulations.

The value of well-directed efforts at sanitary improvement, in conjunction with the treatment of sufferers from hookworm disease is well illustrated by the Georgetown Hospital Returns for 1914, 1915, 1916. The number of patients admitted during 1916 from the Peter's Hall and Belle Vue districts, in which hookworm campaigns were conducted in 1914 and 1915, was 31·5 per cent. lower than the number admitted in 1914, i.e., prior to these campaigns. In contrast the admissions during 1916 from untreated districts fell by only 6 5 per cent. while those from the city of Georgetown rose 14·7 per cent.

Dutch Guiana (1916).*

Work for the relief and control of hookworm disease commenced here in October 1915 and continued under the supervision of Surgeon-General Honourable A. L. SCHENCK throughout 1916. The entire population lives on a strip of coastal plain or mud flat lying along the northern coast and extending for about fifty miles inland. The capital Paramaribo has a population of 40,000 and there are about 155 estates and settlements (each having a population of more than fifty persons) which comprise an additional 38,055 souls. Twelve estates and one settlement lying along the Commewyne river in the Lower Commewyne Area were dealt with during 1916 on the intensive plan.

1916.		Commewyne Area
1. Census		4,470
2. Examined		4,411
3. Found infected		3,900
4. Given first treatment		3,667
5. Cured		3,233
Percentage of infected cured	82·9%	—
Percentage of treated cured	88·2%	—
6. Removed from Area (or dead) ..		330
7. Remaining in Area uncured		337 (8·6%)
(a) Refused	33	—
(b) Medical reasons ..	202	—
(c) Under treatment ..	102	—

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* *Loc. cit.* pp. 75–82.

The effectiveness of the work is borne out by the fact that of 3,900 infected persons in the area only 8·6 per cent. remained at the close of the campaign as foci of infection. More than half of these could not be cured for medical reasons.

The *sanitary improvement* during the course of the campaign was most marked, for whereas at its commencement only 17·8 per cent. of the homes had latrine accommodation during its progress the accommodation was increased to 88·5 per cent. From all the estates reports indicated that the labourers showed marked improvement in general health and in working capacity. On one estate five men were taken at random and it was found that their average wage per working day for the three months after treatment was 34 per cent. higher than for a like period prior to treatment. On another estate the average daily wage for a period of two months after treatment of six men, chosen at random, was found to have exceeded by 38 per cent. that for a period of three months before treatment.

Grenada (1916).*

A change of method was initiated during the year in Grenada. The first eight months were spent in bringing to a close the operations on the dispensary plan which had been begun in 1915 in the Mt. Moritz, St. David's and St. Andrew's areas. From September until the close of the year the intensive method was in operation in five areas, viz. Dougaldston, Concord, Marigot, Grand Roy and Mt. Nesbit, which include the whole of St. John's Parish south of the Dougaldston River. In the Dougaldston area only was the campaign completed by the end of the year. This area consists of one large cocoa estate situated about half a mile from Gouyave and about twelve miles from St. George. The land rises rapidly from the sea-level to the high hills near the central ridge of the island. The people, 426 in number, are mostly negroes with a few East Indians. About 150 live in barracks and an equal number on the main road near the coast; the rest have small houses scattered about the estate which embraces an area of about two square miles.

The results of the year's work given in the subjoined table show the very striking contrast between the percentage of persons cured by the two methods of work. In the dispensary scheme only 20·4 per cent. were cured as compared with 77·1 per cent. under the intensive scheme.

	Dispensary method.	Intensive method (Dougalston).
1. Census	—	426
2. Examined	4,886	426 (100%)
3. Found infected ..	3,885	341 (80%)
4. Given first treatment	3,807 (98%)	340 (99·7%)
5. Cured	776 (20·4%)	262 (77·1%)

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* *Loc. cit.* pp. 83–89.

In the five areas surveyed under the intensive method there were 2,620 persons in 671 homes, only 75 of which were found already provided with latrines.

St. Lucia (1916).*

Activities were confined to the Castries Valley area and a strictly intensive plan of campaign was followed. Work had been completed in a third of this area in 1915; the remainder was completed during 1916. The whole area embraces a population of 10,482 persons of whom 56·6 per cent. were residents in the town of Castries, the rest being suburban rather than rural residents. Over 98 per cent. were coloured. The population dealt with during 1916 numbered 6,214. The work continued under the supervision of Dr. S. BRANCH.

1. Census	6,214
2. Examined	6,003
3. Found infected	2,336
4. Given first treatment	2,201
5. Cured .. .. Percentage of infected cured 81·5% Percentage of treated cured 86·5%	1,904 — —
6. Removed from area (or dead).. ..	121
7. Remaining in area uncured .. .. (a) Refused .. .. 80 (b) Medical reasons .. 15 (c) Under treatment .. 216	311 (13·3%) — —

"The failure to treat all the infected persons until they had been cured was due almost wholly to the migratory habits, procrastination and shiftlessness of certain members of the negro labouring population." It was noted that as the work proceeded farther from the town the suburban districts showed a steady increase in infection. The inhabitants of Castries dump their refuse into a sewage barge which anchors nightly in the river. Additional provisions are being arranged for the following year. In the outlying parts there are 411 houses of which 226 have satisfactory conditions of disposal.

In his report† to the Governor for the half-year ending June 1916, Dr. S. BRANCH states that all persons travelling third class from St. Lucia by the Quebec Steamship Co. are now required to produce certificates that they are free from hookworm infection. This quarantine restriction has proved a valuable advertisement for the local campaign as no one likes to risk the penalty of being returned as an undesirable owing to infection with this parasite.

Recruits for Imperial service were examined. The first batch had shown 67·2 per cent. of infections. The second batch gave 75 per cent. The higher percentage in the later recruits was probably due to the

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**Loc. cit.* pp. 90–98.

† Report by Dr. S. BRANCH received in Colonial Office 31st August, 1916.

fact that more were natives of the colony. "The racial immunity enjoyed by the black-skinned peoples from the extreme ravages of this disease are here amply shown. These men represent the able-bodied youth of the colony chosen for their physical fitness and freedom from other diseases. In only one case was a recruit rejected on account of his infection. The others were treated with little opposition."

Dr. Branch emphasises the need of unceasing education of the children in sanitary ideas. He is convinced that "the erection of closets, privies and latrines and their unceasing supervision will not lead us to a successful issue unless we can educate up the generations to their unfailing use. It is very disappointing to see the children on their way to school performing their toilet on the public highroads, under culverts and bridges."

St. Vincent (1916).*

The territory dealt with up to the close of 1916 embraced the windward side of the central mountain range extending for a distance of eleven miles from Kingstown. This district includes the most populous part of the island. For purposes of the campaign this region was subdivided into five smaller areas, Calliaqua, Belair, Sion Hill, Stubbs and Mesopotamia. The campaign in Calliaqua and Belair was completed in 1915 [see this *Bulletin*, Vol. 9, p. 288.] Work in the remaining three areas was completed during 1916 by Dr. P. B. Gardner under the general supervision of the Colonial Surgeon Dr. C. H. Durrant.

	Sion Hill.	Stubbs.	Mesopotamia.	Total.
1. Census	1,880	2,362	3,325	7,567
2. Examined	1,853	2,346	3,295	7,494
3. Found infected ..	1,120	1,063	1,879	4,062
4. Given first treatment.	1,030	978	1,740	3,748
5. Cured..	907	887	1,520	3,314
Percentage of infected cured	—	—	—	81·6%
Percentage of treated cured	—	—	—	88·4%
6. Removed from area (or dead)	21	11	27	59
7. Remaining in area uncured	192	165	332	689 (17%)
(a) Refused .. 150 (3·7%)	—	—	—	—
(b) Medical reasons 161 (4%)	—	—	—	—
(c) Under treatment 378 (9·3%)	—	—	—	—

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* *Loc. cit.* pp. 99–112.

No compulsion is used in St. Vincent to secure sanitary improvement. The Government makes and sells a fly-proof box to be placed over a pit and the sanitary staff instals the box for every purchaser who digs a pit.

The number of homes inspected was 1,519. Of these 309 had latrines already installed and 147 provided new latrines during the year. On December 31st, 1916, there remained in the areas Belair, Sion Hill, Stubbs and Mesopotamia 992 homes (57·1 per cent.) without latrine accommodation.

Trinidad (1916).*

The campaign was carried out under the direction of Dr. B. E. Washburn from the commencement of the year until May when Dr. G. C. Payne replaced Dr. Washburn who proceeded on leave.

The Borough of Tacarigua was mainly the sphere of active operations during the year. Operations in a second area further east along the Government Railway were set in progress but these were not completed by the close of the year.

In Tacarigua work was undertaken in four adjoining areas: Tunapuna, Tacarigua, Arouca and Lopinot. The first three areas extend eastward for a distance of about six miles along the Government Railway running from Port of Spain to Sangre Grande. The Lopinot area is located in a range of hills in the northern part of the borough and is contiguous with the Arouca area on its southern boundary. Almost all the inhabitants of these four areas are engaged in cocoa or sugar cultivation, some as labourers but the majority as small holders. About 40 per cent. are East Indians, the remainder are of mixed negro or European origin.

The campaign in Trinidad commenced in August 1914 and was conducted at first according to the dispensary plan. Since May 1915 the strictly intensive method was followed. The total number of persons examined up to December 31st, 1916, was 23,651 (viz., 10,204 under the dispensary scheme and 13,447 under the intensive scheme). Of this total 68·3 per cent. were found infected; 83·8 per cent. of these were given first treatment. Of the total, 7,636 cured, viz., 79 per cent. of those given first treatment, were under the intensive method and 11·6 per cent. under the dispensary method.

The sanitary condition of the village of Tunapuna is above that of the average tropical town. An ample water supply is piped along the streets and into some of the houses. The village is well drained. All but 31 of the houses were found to be already provided with satisfactory latrines at the commencement of the campaign and in these new latrines have since been installed by order of the authorities.

In the village of Tacarigua there is a similar water supply and the land is well drained by roadside gutters. In Arouca the people depend on wells, streams and collections of rainwater but the drainage is also good. Practically all the houses with latrines were within the boundaries of the principal towns. Of 3,395 homes inspected 71 per cent. were found provided and at the close of the campaign only 229 additional latrines had been installed. The Government has now placed the entire responsibility for sanitary improvement in the hands of the local authorities and has given an assurance that this work will be rigorously pushed.

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* *Loc. cit.* pp. 113–126.

Trinidad.

Intensive work: Detailed Results of Examination and Treatment in Areas completed during 1916.

	Tunapuna.	Tacarigua.	Arouca.	Lopinot.	Tacarigua Orphanage.	Total.
1. Census	7,428	2,623	3,260	621	224	14,156
2. Examined	6,835	2,581	3,201	606	224	13,447
3. Found infected ..	4,838	2,155	2,458	512	58	10,021
4. Given first treatment	4,319	1,898	2,253	471	56	8,997
5. Cured	3,185	1,597	1,910	362	56	7,110
Percentage infected cured ..	66%	74·1%	77·7%	70·7%	96·6%	71%
Percentage of treated cured ..	—	—	—	—	—	—
6. Removed from area (or dead)	626	69	136	16	2	849
7. Remaining in area uncured	1,027	489	412	134	—	2,062 (20·6%)
(a) Not located 0·3%	—	—	—	—	—	—
(b) Refused 12·2%	—	—	—	—	—	—
(c) Medical reasons 7%	—	—	—	—	—	—
(d) Under treatment 1%	—	—	—	—	—	—

In the monthly report of the Medical Officer in charge of ankylostomiasis operations* it is stated that examinations of immigrants showed only 7 per cent. of infected among 198 persons. These immigrants had been treated on the intensive method during their trip from Calcutta to Port of Spain. The results are in striking contrast to those found in immigrants by s.s. "Dewar" last year when 84 per cent. of 298 persons were found to be still infected on their arrival in the colony. The success of the present measures, if maintained, will remove an important source of infection to the colony.

Costa Rica (1916).†

The dispensary plan of campaign, commenced in September 1914, has been followed but this latterly has approximated to the intensive system wherever the topography and proximity of the homes would permit.

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* Trinidad and Tobago, Council Paper No. 90 of 1916.

† Rockefeller Foundation. International Health Board. Third Annual Report. 1916. pp. 127–138.

In the earlier reports the figures given related to the number of specimens examined, not to the number of persons. These have now been revised to bring these reports into line with those of other areas.

Dispensary work.	During 1915.	During 1916.	Total to Dec., 1916.
Census..	44,593	46,114	90,707
Examined	30,297	40,579	70,876 (78·1%)
Found infected ..	19,401	22,608	42,009 (59·3%)
Given first treatment	18,816	22,037	40,853 (97·2%)
Cured	1,962	5,666	7,628 (18·7%)

Guatemala (1916).*

The work continued under the supervision of Dr. W. H. Rowan until June 28th when he was succeeded by Dr. A. M. Struse. Headquarters are in Guatemala city. In the latter part of the year an effort was made to put the work on a strictly intensive basis with Plantations as units of operation. Almost all are coffee estates, though sugar is raised on a few, and afford peculiarly favourable circumstances for effective work against the disease. The population is concentrated within small areas and considerable control can be exercised over the patients during their examination and treatment.

In the campaign about 9,218 of the 48,290 square miles of the country have been covered to date. More than four-fifths of this area lies in the plateau in the south, a short distance inland from the Pacific Coast. The labourers on the estates are mostly Indians and usually present severe clinical symptoms of the disease. During 1916 Plantations and towns with a census of 42,086 persons were dealt with. 39,596 or 94·1 per cent. were examined; 26,665 or 67·3 per cent. of those examined were found infected, 25,961 or 97·4 per cent. were given first treatment and 10,475 or 40·3 per cent. were cured.

The zone of heaviest infection lies in the departments of Retalhuleu, Suchitepequez and Escuintla on either side of the rail between Guatemala city and Ayutla. In Guatemala city the infection proved very light and was found to be largely confined to the poor and to inmates of the general hospital.

Sanitary Improvement: the installation of latrines on all Plantations and at all schools and residences and other buildings was made compulsory by presidential decree but the Department of Uncinariasis which is a division of the National Board of Health, has preferred to exercise no authority and sought rather to stimulate interest in order to secure voluntary co-operation. Prior to the campaign only 576 latrines were in use among 70,176 persons. During the year 1916 1,646 new latrines were erected providing accommodation for 35,260 persons and making a total to date of 2,694 new latrines with accommodation for about three-quarters of the population in the area under survey.

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* *Loc. cit.* pp. 139–147.

Nicaragua (1916).*

The Department of Uncinariasis continued throughout the year the work initiated under Dr. D. M. MOLLOY'S supervision and confined its activities to the portion of the Pacific side extending from the Gulf of Fonseca to the north-western part of Lake Nicaragua. The inhabitants of this area subsist on agriculture and trade. They live mostly in towns of considerable size. Relatively few live permanently on the Plantations. Eighty per cent. of the population are Mestizos, i.e., persons of mixed Indian and European descent.

During the year practically no work was done on coffee or sugar Plantations. Headquarters were established in Managua. The method followed is the dispensary plan. The areas in which the campaign was pursued are not detailed in the report for 1916 but it is stated that the figures given include the examinations made at the central offices in Managua.

During the year 1916, 26,141 persons were examined. 16,518 or 63·2 per cent. were found infected and 15,473 or 93·7 per cent. of these were given first treatment. The number of "cured" is not stated.

Little progress was made in improving the sanitary condition during the year and this is attributable to the lack of general sanitary laws compelling the use of latrines.

Panama (1916).†

Dr. L. W. HACKETT was director in charge of the campaign during the year. Since February 1916 activities have been confined to the section of the country lying west of the canal and south of the central mountain range. Here the population is dense and there is a heavy infection with hookworm. During 1916, 30,094 persons were examined. 24,193 (80·4 per cent.) were found infected and 23,747 or 98·2 received first treatment. Of 11,045 re-examined 49·9 per cent. were ascertained to be cured. These represent about 86 per cent. of the total population of the districts under survey.

In the city of Panama hookworm disease practically does not exist among the residents owing to thorough sanitation and the universal use of shoes.

Sanitary improvement is small owing to the absence of effective laws and the extreme difficulty of enlisting the voluntary co-operation of any considerable proportion of the inhabitants. In many parts of the country there are large areas of lowland in which latrines would become flooded. It is recognised that the basic problem in these sections is drainage rather than latrine construction.

Salvador (1916).‡

A department of Uncinariasis was organised as a bureau of the National Board of Health and commenced operations in March 1916.

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* *Loc. cit.* pp. 148–153.

† *Loc. cit.* pp. 154–161.

‡ *Loc. cit.* pp. 162–168.

Dr. C. A. Bailey assumed active charge in May and continued the campaign both on dispensary and intensive lines.

A town or estate is the unit and here the intensive method is applied. Where persons come to the Laboratory from outlying areas they are examined and treated after the dispensary method. The statistics however are not shown separately and for the present the work is classed as being of the dispensary type. The work has so far been confined to the department or State of San Salvador.

The following table shows the work completed up to December 31st, 1916. During the early months operations were confined entirely to the city of San Salvador. The percentage of infected is comparatively low as a large number of persons there were examined and found negative. There is a sewer system which largely prevents the spread of hookworm infection. The small number of persons cured is due to the removal of the military force, national guard and municipal police before re-examination could be made after treatment.

Dispensary Method.	Total for 1916.
1. Census	11,727
2. Examined	9,975 (85·1%)
3. Found infected	3,444 (34·5%)
4. Given first treatment	2,946
5. Cured .. .. Percentage of infected cured 44·5 % Percentage of treated cured	1,311 — —
6. Removed from area (or dead)	502
7. Remaining in area uncured	1,133

Throughout the Republic are many coffee and sugar estates. On the former the conditions favour the spread of the infection but on the latter the infection is not so rife as the soil is less shaded and less moist. Very little progress in sanitation was made during the year.

Ceylon (1916).*

During 1916 active measures for the relief and control of hookworm disease were instituted in the Matale district under the supervision of Dr. H. H. Howard and later of Dr. W. P. Norris and Dr. J. E. Snodgrass. The selected area is situated in the central part of the island about seventy-five miles from Colombo and is seven by ten miles in extent. There are from forty to fifty towns, villages and hamlets and twenty-four rubber and tea estates included within its boundaries. The estate population numbers 8,000 and that of the villages 18,000 approximately.

Both intensive and dispensary plans of campaign have been followed. The intensive method was applied wherever possible but owing to obstacles, most of them of a religious nature, the dispensary method had to be substituted in the villages Alawatagoda and Wilane. Examination and treatment was provided on the dispensary plan in the central office at Matale and in the village Katugastota. The total number examined during the year was 7,645 of which 4,567 were treated under the intensive scheme and 3,078 under the dispensary scheme.

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* *Loc. cit.* pp, 169–179.

Intensive Method 1916.	Estates.	Villages.	Total.
1. Census	3,761	1,018	4,779
2. Examined	3,697	870	4,567
3. Found infected	3,647	846	4,493
4. Given first treatment ..	3,568	533	4,101
5. Cured	2,938	252	3,190
Percentage of infected cured	—	—	71%
Percentage of treated cured	—	—	77·8%
6. Removed from area (or dead)	537	114	651 (14·5%)
7. Remaining in area uncured ..	—	—	652 (14·5%)
(a) Refused .. .. 9·4%	—	—	—
(b) Medical reasons 2·4%	—	—	—
(c) Under treatment 2·7%	—	—	—

The following table gives a comparison of results by the intensive and dispensary methods :—

	Intensive.	Dispensary.
1 Census	4,779	—
2. Examined	4,567 (95·6%)	3,078
3. Found infected	4,493 (98·4%)	2,865 (93·1%)
4. Given first treatment ..	4,101 (91·3%)	2,651 (92·5%)
5. Cured	3,190 (77·8%)	441 (16·6%)

The intensive work was much more effective on the estates than in the villages. In addition to religious opposition, which leads the adherents of one faith to oppose participation with those of another in the same campaign, the villagers have a fixed belief that a purgative in wet weather is dangerous. In Ceylon this constituted a serious hindrance as a large proportion of the days are more or less rainy. A further difficulty lay in the movement of labourers. 537 (14·7 per cent.) infected labourers removed from the selected estates while the work was in progress.

None of the ten estates, on which work in 1916 was completed, was provided at the commencement of the campaign with latrines for their labourers. In the villages Alawatagoda and Wilane only nine latrines accommodated 274 homes. 184 additional homes were provided for during the campaign, leaving only 81 unaccounted for.

An existing Ordinance makes it compulsory for all estates to provide adequate latrine accommodation within one year, but the senior sanitary officer has no authority to supervise estate sanitation.

R. T. L.

NOZOE (M.). [**Method of making Fixed Preparations of Parasite Eggs.**] —*Taiwan Igakukai Zasshi.* (*Jl. Formosa Med. Soc.*) 1917. Apr. 28 No. 174. pp. 280–282.

[Based on Review by R. G. MILLS.]

The eggs are first isolated by any familiar method or a portion of the faeces may be used without preliminary treatment. A couple of loops full of saturated salt solution are placed on a slide and a few of the eggs floated on this. A few loopfuls of 40 per cent. gelatine are then warmed in the flame to about 37° C. and mixed thoroughly with the eggs in the salt on the slides. The whole is then spread out thinly over the slide, care being taken not to injure the eggs. The gelatine is now hardened in an ice box or by an ether spray applied to the under surface of the slide. The slides are then placed in formalin for about 10 minutes and afterwards washed. The film is stained with Giemsa's stain or by azur-azur-eosin. The resulting preparation is uniformly purple with the contents of the eggs blue enclosed in purple shells.

In a second method the eggs are unstained, being mixed with a gelatine to which carbolic acid 0·5 per cent. has been added. The coverglass preparation is sealed by Canada balsam. Thus prepared the eggs keep in their natural condition for a long time.

R. T. L.

CHOLERA.

VON ROEMER (L.S.A.M.). **Over de Cholera te Batavia in 1915 en 1916.** [Cholera in Batavia during 1915 and 1916.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 2. pp. 295–308. With 10 charts & 7 maps.

A detailed statistical description of the cholera epidemics of 1915 and 1916 and to some extent of 1913 and 1914 as well. The facts of general interest are those relating to cholera inoculation and are shown in the following table:—

Year	Number inoculated	Number uninoculated	Percentage that acquired cholera	Case mortality percentage
1915	100,000	—	0·02	80
,,	—	59,504	0·58	86
1916	81,527	—	0·0098	87·3
,,	—	77,752	0·3	87 2

H. Schütze.

GUERRINI (Guido). **Endozooparassiti dell' intestino e colera. (Note statistiche.)** [Intestinal Parasites and Cholera.]—*Pathologica.* 1917. June 15. Vol. 9. No. 206. pp. 169–171.

The author examined some 641 people, dividing them up into groups and sub-groups according to their being military, civilian, prisoners-of-war or refugee patients (actual cases, carriers or convalescents). While 46·2 per cent. of the 195 carriers harboured parasites of one kind or another, and of 121 actual cases 30·6 per cent. and of 325 convalescents 28·7 per cent., it was seen that one particular parasite, *Trichocephalus trichiuris*, was present in 97·3 per cent. of those harbouring parasites when they were actual cases but in only 4·5 per cent. when they were carriers. The author does not think these figures fortuitous and deduces from them that the presence of intestinal parasites, particularly *Trichocephalus trichiuris*, predisposes to cholera. On the other hand another parasite, *Oxyuris vermicularis*, is present in 66·7 per cent. and 55·9 per cent. of infected cases when they are carriers and convalescents, though in only 18·9 per cent. when they are actual cholera cases, but the author does not comment on this.

H. S.

ROGERS (Leonard). **The Mortality from Post-Choleraic Uraemia: A 70 per cent Reduction through Intravenous Injections of Sodium Bicarbonate.**—*Lancet.* 1917. Nov. 17. pp. 745–746.

The decline in cholera mortality that the following table shows is, as pointed out by the author, principally due to a decrease in deaths from uraemia :—

Total Cholera Mortality and the Deaths from Uraemia before and after the Use of Alkalies.

Without Alkalies.

Years.	Total cases.	Deaths.	Per cent.	Uraemia deaths.	Per cent.
1912 ..	170	54	31·76	24	14·11
1913 ..	200	49	24·5	17	8·5
1914 ..	222	49	22 01	25	11·2
1912–14..	592	152	25·6	66	11·1
		With Alkalies.			
1915 ..	226	39	17·22	6	2·64
1916 ..	204	52	25·5	8	3·92
1917 ..	154	24	15 6	5	3 2
1915–17..	584	115	19·7	19	3·25

The author's routine of treatment is as follows :—

In patients admitted early without prolonged suppression of urine the hypertonic solution (120 grains sodium chloride with 4 grains calcium chloride to 1 pint of sterile water) only is used at the first transfusion. If the case is sufficiently severe to require further injections, at each subsequent transfusion one pint of alkaline solution (60 grains of sodium chloride and 160 grains of sodium bicarbonate to the pint) is first given and followed by the hypertonic chloride solution in the quantity indicated by the specific gravity of the blood. In cases with suppression of urine the alkaline solution is given at the first injection as well. Moreover it is used in all cholera cases with deficient urinary secretion without much concentration of the blood as shown by the specific gravity. In addition, this solution is now used in the place of normal saline by the bowel.

H. S.

Arzt (Leopold). **Ueber Exantheme bei Cholera asiatica.** [Cholera Rash.] —*Wien. Klin. Woch.* 1917. July 19. Vol 30 No. 29. pp. 901–904.

Three old cases [this *Bulletin*, Vol. 6, p. 29] are recapitulated and a fourth new one added in which the rash was a brownish red, macular, confluent eruption occurring during convalescence on the lower chest, abdomen and inner side of the thigh. There was no ecchymosis or irritation.

The author considers a toxin, possibly the haemotoxin, as responsible.

H. S.

Takano (R.) & Yabe (S.). **[Sensitized Vaccine Treatment of Cholera.]** —*Saikin Gaku Zasshi.* (*Jl. Bacteriol.*). 1916. Nov. 20. No. 254. pp. 39–66.

[From Review by R. G. Mills.]

The authors report a slight loss of antigenic power as a result of the sensitization but the reaction following injection was greatly decreased.

H. S.

GREIG (E. D. W.). **The Results of the Bacteriological Examination of the Stools of 659 Cases of Cholera at Calcutta.**—*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 651–657.

The following quotation is a summary of the work reviewed by the author and carried out during more than three years, thus including three epidemic periods.

"Total number of cholera cases in which the stools were examined bacteriologically, from November 1912 to January 1916	659	
The results are :—		
1. Cholera vibrio found in stools in	506 cases	= 76·75 %
2. Cholera-like vibrio found in stools in	51 ,,	= 7·75 %
3. Cholera and cholera-like vibrios found in	30 ,,	= 4·50 %
4. No vibrio found in the stools in	72 ,,	= 11·0 %

"Summary of bacteriological examination of stools of fatal cases in 659 total.

Total fatal cases examined from November 1912 to January 1916	132	
The results are :—		
1. Cholera vibrio found in stools in	112 cases	= 84·8 %
2. Cholera-like vibrio found in stools in	1 ,,	= 0·8 %
3. Cholera and cholera-like vibrio found in	8 ,,	= 6·1 %
4. No vibrio found in stools in	11 ,,	= 8·3 %"

The negative cases were only finally reported after repeated examination. Dieudonné medium was used throughout. The cholera-like vibrios appeared to crop up mainly during the zenith and decline of an epidemic and only in the less severe cases ; it is not manifest whether they are to be regarded as pathogenic or not.

H. S.

CASTELLANI (Aldo). **A Method to facilitate the Isolation of the Cholera Vibrio and other Organisms.**—*Brit. Med. Jl.* 1917. Oct. 13. pp. 476–477. *Jl. Trop. Med. & Hyg.* 1917. Dec. 1. Vol. 20. No. 23. pp. 272–273.

The idea at the back of this isolation method, which may be regarded as the inverse of BANDI'S, is to agglutinate in the peptone water culture tube and as they grow, all organisms but the one to be isolated. For instance, the author's recipe for the isolation of cholera vibrios from a stool :—

"Inoculate peptone water tubes with the faecal matter . . . add to each tube : 3 to 5 drops polyvalent lactose fermenters faecal bacteria serum (*B. coli, B. pseudo-coli, B. coli tropicalis,* etc.) . . . 3 to 5 drops polyvalent non-lactose fermenter faecal bacteria serum (*B. proteus* group, etc. 3 to 5 drops paratyphoid B serum." In no case must the added sera contain coagglutinins for cholera to any extent. In the example quoted *B. coli, B. proteus,* etc., as they multiply are immediately agglutinated and sink to the bottom of the tube or at any rate form clumps which are speedily sedimented by centrifuging. The supernatant turbid in this case from the unhindered development of *V. cholerae* can now be examined microscopically by agglutination with cholera serum and by plating on to suitable medium if any doubt exists.

The author admits however that " in practice things are not so easy . . . (1) The intestinal bacterial flora found in association with the cholera vibrio varies to a certain extent from country to country, from epidemic to epidemic, and even from individual to individual . . . (2) The preparation of powerful agglutinating serums against certain intestinal germs is far from easy. (3) Occasionally certain intestinal micro-organisms are at first inagglutinable by their homologous serums."

H. S.

DE RAADT (O. L. E.). **Ueber den diagnostischen Wert des Serumpeptonverfahrens bei der bakteriologischen Diagnose der Cholera.** [Cholera Diagnosis with Serum Peptone Water.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. Aug. 30. Vol. 80. No. 1–3. pp. 12–15.

By means of a modification of BANDI's method of cholera diagnosis (inoculation of suspected material into peptone water containing specific cholera serum and agglutination of *V. cholerae* in statu nascendi) the errors of that method, viz., the difficulty of reading a result owing to a granular faeces, or one with a slimy deposit, or owing to the inhibition of growth when only very few cholera vibrios are present, are obviated, the modification consisting in preliminary enrichment in peptone water. The author considers it particularly suitable when the investigation is being carried out without laboratory conveniences, when unskilled persons are employed and when time is to be saved.

H. S.

BAUMGARTEN (Arnold) & LANGER-ZUCKERKANDL (Helene) **Ueber elektive Choleranährböden.** [Selective Cholera Media.]—*Ztschr. f. Hyg. u. Infektionskr.* 1917. May 3. Vol. 83. No. 3. pp. 389–406. With 5 charts.

The paper is in the main a criticism of SEIFFERT and BAMBERGER'S chlorophyll cholera medium [this *Bulletin*, Vol. 8, p. 164]. The authors do not find it to be more selective than ARONSON'S of which it is a modification.

Baumgarten and Langer-Zuckerkandl, using peptone water to which had been added dextrin, saccharose and decolourised fuchsin as contained in Aronson's medium [this *Bulletin*, Vol. 6, p. 495], claim to show that while haematoporphyrin encouraged the growth of *V. cholerae* [see Fig. 1] chlorophyll does not do so [see Fig. 5]. [It is patent however that the two experiments are not comparable in that one is carried out minus and the other plus alkali].

In Fig. 5 is also seen the inability of malachite green to suppress the growth of cholera, whereas many other organisms are inhibited by it in the same concentration.

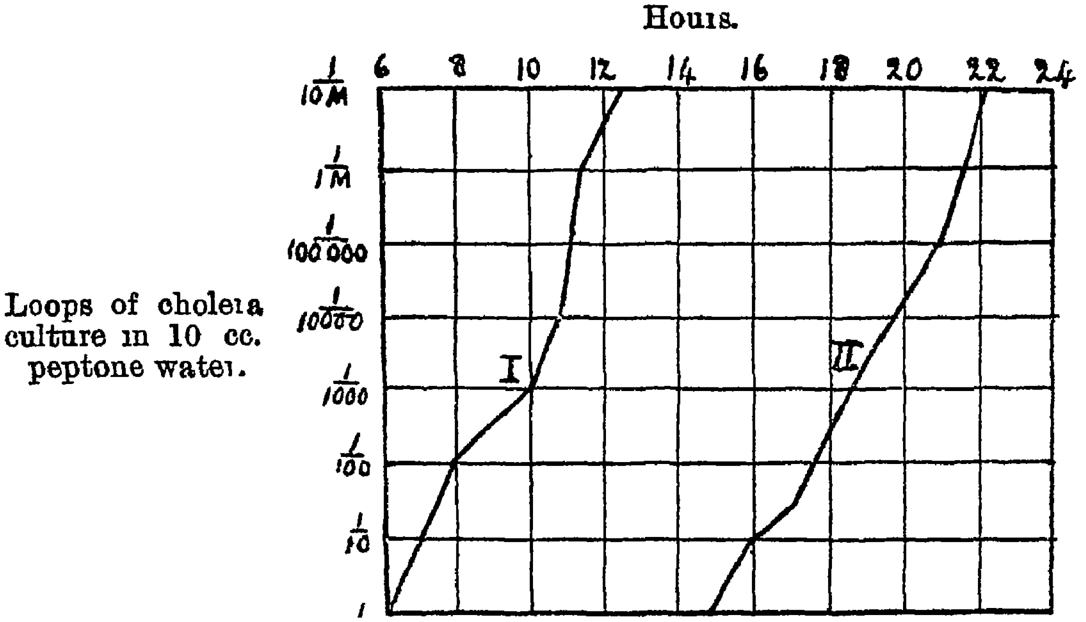

FIG. 1.

I. Peptone water + 2% of a 10% soda solution saturated with haematoporphyrin.
II. Peptone water + 2% of a 10% soda solution.

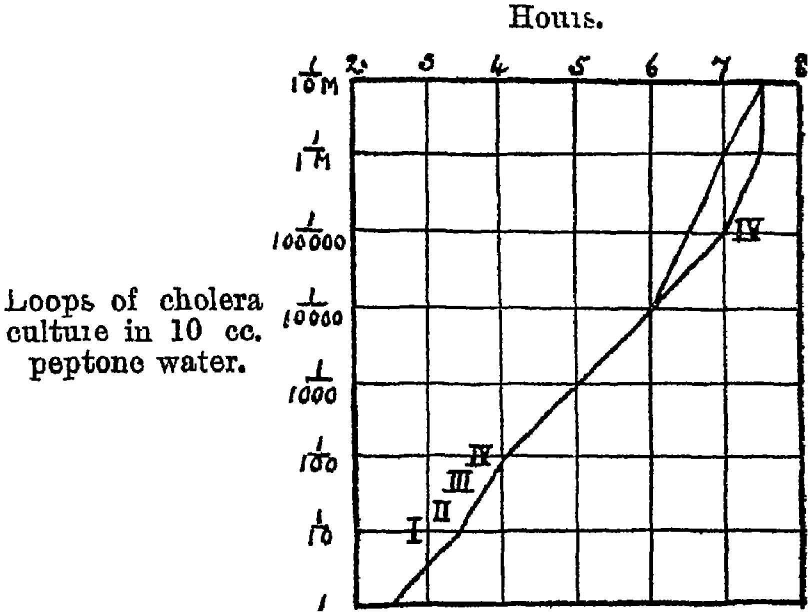

FIG. 5.

I. Peptone water.
II. „ „ + 2% chlorophyllin.
III. „ „ + 8% „
IV. „ „ + 0·4‰ malachite green.

The curves in the figures indicate the time at which the growth of *V. cholerae* has so far advanced as to recolour strongly the fuchsin contained in the peptone water, for various concentrations of cholera inoculation.

The authors therefore recommend Aronson's medium using a soda solution saturated with haematoporphyrin or haemin. Using artificial cholera stools they found that the growth of cholera colonies on their modification was more rapid than on the original Aronson.

H. S.

GREIG (E. D. W.). **Bacteriological Studies of Cholera-Like Vibrios isolated from the Stools of Cholera Cases in Calcutta. I. Serological Investigations.**—*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 658–671.

Following on a serological investigation of cholera-like vibrios isolated from water [this *Bulletin*, Vol. 10, p. 84] the author examined some 70 cholera-like vibrios isolated from cholera stools and found (1) that none was able by rabbit-inoculation to occasion the production of agglutinins for the Koch vibrio, (2) that it was possible to classify all but 13 strains under 9 headings, one group having the large number of 30 members, and (3) that in the serum of patients harbouring these cholera-like vibrios, agglutinins for these strains were either not present or only in small amounts; this would however, in the author's opinion, not exclude the vibrios having some etiological relationship to the illness from which their hosts had been suffering.

H. S.

MURILLO (F.) & MOURIZ (J.). **La determinación especifica de las bacterias y, en particular, de los vibriones del cólera y los vibriones del Tor.** [The Specific Differentiation of Bacteria and, in Particular, that of Cholera and El Tor Vibrios.]—*Bol. Inst. Nac. Higiene de Alfonso XIII.* 1917. Mar. 31 & June 30. Vol. 13. Nos. 49, 50. pp. 1–8; 105–115.

By means of a complement deviation test, carried out on the usual lines, the authors find that the cholera and El Tor vibrios should be ranked as distinct species, although by other tests, such as agglutination, they would be regarded as identical. The opinions of authors, such as CRENDIROPOULO, who have recently studied the question are passed in review.

J. B. Nias.

FELDMANN (Ignatz). **Ueber choleraähnliche Vibrionen mit besonderer Berücksichtigung ihrer Mutationsvorgänge.** [Cholera-Like Vibrios and Mutation.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. Nov. 15. Vol. 80. No. 4. pp. 129–160.

A very detailed description of 10 strains isolated in Gyula [Hungary] in 1913, 1915 and 1916. The author found that three and three only of his strains reacted similarly in the agglutinating test, crossing them all with their various specific sera, and as these corresponded in all other ways with one another, he concluded that the agglutination test was a reliable one for differentiating purposes. [As, however, these three strains were obtained one from the mixed faeces and the two others from the segregated faeces of a single family, there is no reason to look upon the three series of tests (cultural, serological, etc.), as anything else than a double repetition, the same strain being used throughout.] The complement fixation tests carried out with the 10 strains covered exactly those of agglutination.

Following the methods of BAERTHLEIN (plating an 8 day broth culture on to agar) and BAIL (plating a saline emulsion of the vibrio kept at 37° C. for 8 days) the author attempted to differentiate cholera-like vibrios from the Koch vibrio and from one another by the mutation forms that resulted, but it was impossible to do so, the vibrios mutating similarly in all cases.

H. S.

NICHOLLS (Lucius). **The Chemical Affinities of *Vibrio cholerae*.**—*Lancet.* 1917. Oct. 13. pp. 563–566.

A paper giving a number of charts which compare the susceptibility of *V. cholerae* with that of certain other organisms to alkalis, acids, salts and aniline dyes. The well-known tolerance towards alkalis and intolerance towards acids of the Koch bacillus is demonstrated. The following medium is recommended for the isolation of cholera vibrios when present in small numbers.

To 3 litres of unboiled tap water add 1·2 gm. calcium oxide and 30 gm. Witte peptone. No comparative tests are recorded, but a successful isolation is described; an almost pure cholera pellicle was obtained in two days when to 3 litres of the above medium were added 50 gms. of normal stool, *B. coli* and *B. acidi lactici* and as small a quantity of *V. cholerae* as 1 cc. of a 1 : 100,000 dilution of a 24-hours-old (presumably peptone water) culture.

Another method, which is outlined, is to add to three 5 cc. samples of stool normal caustic soda solution until the tubes contain 3·2, 3·5 and 3·75 per cent. of that alkali; after one hour the contents are emptied into peptone water flasks and inoculated; here destruction of many non-cholera organisms by the alkali renders isolation of *V. cholerae* more easy.

The author recommends the addition of calcium carbonate as an antacid to stools which have to stand some time before examination in order to prevent the destruction of cholera vibrios by acids formed during fermentation of the stool.

H. S.

CROWELL (B. C.) & JOHNSTON (John A.). **Bacteriologic Investigation of Faeces and Bile of Cholera Cases and Cholera Carriers.**—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. Mar. Vol. 12. No. 2. pp. 85–103.

An interesting paper which discusses and gives a good bibliography for a number of points in relation to cholera, including carriers, the corporeal route of infection, the presence of vibrios in the gall bladder, the significance of cholera-like vibrios. "In 212 cases of cholera [which they investigated] the vibrio was found in the bile in 65·2 per cent. and only in the bile in 5·7 per cent. In 32 cholera carriers detected after death, the cholera vibrio was found in the bile in 75 per cent. and only in the bile in 43·7 per cent."

Some 30 vibrio strains, morphologically and culturally like the Koch bacillus, recovered from the faeces and gall bladder of cholera patients, cholera carriers and others, which on isolation were agglutinatively negative with $\frac{1}{100}$ of a 1 : 6,000 cholera serum, were grown on ox bile and agar alternately; after 40 transfers 8 (6 from cholera patients and 2 from carriers) agglutinated with $\frac{1}{500}$ microscopically, with $\frac{1}{4000}$ macroscopically [sic] of apparently the same titred serum. Of these 8 strains, 3 lost the agglutinating property again after 2 months and the other 5 agglutinated less promptly. Even when in good agglutinating condition, these 8 strains were not capable of producing serum which would agglutinate the true cholera vibrio.

H. S.

SCHOEBL (Otto) & PANGANIBAN (C. S.). **Experimental Cholera Carriers and Immunity.**—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. Mar. Vol. 12. No. 2. pp. 43–49.

Guinea-pigs and rabbits infected with cholera vibrios intravesicularly were found to develop agglutinins for that organism; agglutinins were also present in the gall of such animals, though absent when the animal had only received intravenous inoculation of killed vibrios. It could not be shown that inoculation was a prophylactic against the induction of the carrier state by intravesicular injection of living vibrios (16 guinea-pigs); this, as the author himself points out, is a very severe test, seeing that the animals received but one inoculation and that large numbers of vibrios were injected into the gall bladder.

Inoculation with cholera vaccine following on infection of the gall bladders did not reduce the carrier period (9 guinea-pigs).

H. S.

SCHOEBL (Otto). **The Influence of Bile upon the Distribution of Cholera Vibrios in the Digestive System of Experimental Cholera Carriers.** —*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. Jan. Vol. 12. No. 1. pp. 23–24.

A paper on very similar lines to one already published by the author [this *Bulletin*, Vol. 10, p. 83]. Guinea-pigs infected with *V. cholerae* by gall bladder inoculation were killed from 8–12 days afterwards and the Koch bacillus sought in various parts of the alimentary tract. In the six cases where ox bile had been fed to the animals, vibrios were found in every case in the gall bladder, duodenum, ileum, caecum and faeces, while in the five animals that received no bile, vibrios were absent three times from the faeces, twice from the caecum and once from the duodenum and when present, were generally there in smaller numbers than when ox bile had been ingested.

H. S.

BAIL (Oskar). **Untersuchungen über Vibrionenvergiftung.** [Researches on Vibrio Toxins.]—*Ztschr. f. Immunitätsf. u. Exper. Therap.* 1917. July 25. Vol. 26. No. 4. pp. 330–367.

A long paper, thickly sown with experiments, which is best read in its entirety and of which the following is a summary.

Inoculation with a watery extract of *V. kadikjöji* produces an antitoxic serum which acts according to the law of multiples. The antitoxic action is removed by vibrios themselves only when these are equal in amount to that quantity of vibrios which would give enough (watery extract) toxin to produce the same neutralising effect.

An inverted Danysz phenomenon is observable in that an amount of toxin which is capable of just neutralising a certain quantity of anti-toxin, is not able to do this if the toxin is added by degrees and not all at one time.

Antitoxic serum can only protect against a bare lethal dose of living vibrios and when multiplication is rendered impossible by the addition of bactericidal serum. The toxin obtained from *V. kadikjöji* cannot, therefore, be regarded as the true endotoxin.

Normal serum from a variety of animals is capable, when used in large quantities, of neutralising endotoxin. Heating, ageing and absorption by any kind of microorganism removes this power from normal serum, which would indicate that complement is the active body concerned.

If serum is added when extracting *V. kadikjöji* very little toxin is obtainable and as this occurs whether the serum is active or not, it cannot be due to a neutralisation of the toxin.

H. S.

KREDIET (G. J.) **Choleravaccinatie te Batavia in 1914.** [Cholera Inoculation in Batavia.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 2. pp. 253-259. With 6 charts.

After an apparently ineffectual inoculation campaign in 1911, a second attempt at the curtailment of a cholera epidemic by inoculation on a large scale was made in 1914.

The epidemic began gradually on the 8th September; inoculation was commenced on October 1st and carried through in a short time, on 90 per cent. of the population in the district Batavia, on 50 per cent. in the district Weltevreden. From October 10th in Batavia and from October 20th in Weltevreden a big decline in the occurrence of fresh cases was observed; as, however, there was no control population [the author does not state what happened to the uninoculated half of the Weltevreden population and why they could not have served as controls] one could not be sure of the inoculation being the cause of this decline. Nevertheless the author considers that a beneficial effect may be inferred from the following points:—

(1) A marked fall in the number of cases so early in the epidemic is unusual in Batavia.

(2) This fall occurred first in the Batavia district where 90 per cent. of the population had been inoculated, in spite of the fact that the locality is a notoriously unhygienic one, and only subsequently in the Weltevreden district where but 50 per cent. were inoculated.

(3) There was no recurrence of cholera for six months, when the immunity produced might be regarded as on the wane.

The 1915 epidemic was also quickly suppressed by an inoculation campaign embracing 85 per cent. of the population.

H. S.

CASTELLI (Agostino). **Osservazioni e ricerche sulla vaccinazione anticolerica. Nota.** [Cholera Inoculation.]—*Sperimentale.* 1917. Oct. 15. Vol. 71. No. 4. pp. 249-264.

Comparing the more usual bacterial vaccine with LUSTIG and GALEOTTI's nucleo-protein one, the author points out a variety of reasons for preferring the latter. The substance inoculated is more homogeneous and pure, is more quickly absorbed and can be kept in the dry state; dosage is more easily regulated.

The original work reported in the paper consists of researches into the differences resulting from the inoculation of 90 men, half with a nucleo-protein vaccine (1 cc. subcutaneously on two occasions with 7 days interval) and half with a bacterial vaccine (2,000 million followed by 4,000 million 7 days later).

The local reactions were in both groups negligible; a general reaction (headache, temperature and diarrhoea) occurred among the nucleo-protein group in 22 per cent. after the first and in 24 per cent. after the second inoculation, while among those receiving the bacterial vaccine, a general reaction was observable in 37 and 64 per cent. respectively.

The men's sera were examined for agglutinins and bacteriolysins 20, 30, 40 and 60 days after inoculation. While those inoculated with nucleo-protein vaccine produced no agglutinins, the other group gave titres ranging from $\frac{1}{25}$–$\frac{1}{250}$, the maximum being reached about 30 days after inoculation. Bacteriolysins were present in both groups about equally, titres between $\frac{1}{25}$ and $\frac{1}{500}$ being found.

H. S.

Weber (R.). Experimentelle Untersuchungen zur Frage der Schutzimpfung gegen Typhus und Cholera. [Typhoid and Cholera Inoculations.]—*Ztschr. f. Hyg. u. Infektionskr.* 1916. Nov. 23. Vol. 82. No. 3. pp. 351–404.

In experiments in which guinea-pigs were immunised and subsequently tested for immunity by lethal injections of living vibrios, similarly prepared cholera vaccines, up to one year in age, did not differ in antigenic power, except in those cases where a granular substance had separated out and floating on the surface of the vaccine could not be re-emulsified by shaking.

Inoculation with cholera vaccine alone or with a mixed vaccine of typhoid and cholera would seem to produce the same degree of cholera immunity in guinea-pigs as tested with a lethal inoculation and in human beings as tested serologically (agglutination and Pfeiffer's test); in fact there is apparently an additional stimulus to the production of antibodies for the vibrio in the presence of another organism in the vaccine, although the local and general reactions were not more pronounced when a mixed vaccine was inoculated.

A very noteworthy fact indicated by the paper is the strongly marked individuality of response to inoculation exhibited by animals. Even batches of as many as twenty animals may give misleading results.

H. S.

Jimura (Y.). [Disinfection of Fresh Fish with Solutions of Dilute Hydrochloric Acid as a Prophylactic against Cholera.]—*Saikin Gaku Zasshi.* (*Jl. Bacteriol.*). 1916. Nov. 20. No. 254. pp. 67–75 [From Review by R. G. Mills.]

During the recent cholera epidemic in Japan public attention was called to the danger of eating fresh fish exposed in the markets for sale, on the grounds that they might have come from an infected part of the sea. Some of these fish are eaten raw; hence the demand for some form of disinfection that would permit the practice under these conditions. Solution of HCl 1/30 per cent. was used and was found insufficient because of its lack of penetration. This was somewhat increased by the addition of salt to the amount of 3 per cent. but was considered unsafe for general use. 1/10 per cent. salicylic acid was also tried with no better success.

H. S.

TYPHUS.

1 Robertson (Muriel). **Recent Researches into the Aetiology of Typhus.** (Discussion.)—*Proc. Roy Soc. Med.* (Sect. of Epidem. & State Med.) 1917. June. Vol. 10. No. 8. pp. 95–118.

1. Foulerton (Alexander G.R.). **On Typhus Fever.**—*Jl. Roy. Army Med. Corps.* 1917. Aug. Vol. 29. No. 2. pp. 224–228.

Miss Robertson, in the above paper, gives an excellent summary of most of the recent experimental work which has been carried out in regard to the aetiology of typhus fever.

Dr. Brownlee, who took part in the subsequent discussion, stated that, in his experience, typhus fever was "a disease with almost no complications" and that such as do occur are due either to neglect or want of proper nursing care. He also stated that race plays an important part in susceptibility to this disease, and instanced the Irish in Glasgow and London as demonstrating the considerable variation of immunity which may exist. The epidemiological evidence appeared to him to afford conclusive proof of the transmission of the disease by vermin.

Lieutenant-Colonel E. W. Goodall gave an instance, from his own experience, which led him to believe that transmission of the disease may occasionally be brought about by other means than lice.

Major A. G. R. Foulerton suggested that the relative frequency of double-infection [i.e., the occurrence of typhus fever with another infectious disease] is an explanation, "in part, of the variety of parasites described as having been obtained by bacteriological examination of the blood from cases of typhus fever."

Major Foulerton quoted Professor Jürgens as describing an experiment, carried out in Germany, in which twenty healthy men were closely confined with twenty men suffering from typhus fever who had been freed from lice, without any spread of the infection. He also quoted the case, recorded by Nicolle, of the warder in a colonial prison who maliciously transferred lice from a prisoner with typhus fever to two healthy individuals, both of whom became infected. All the evidence, he considered, went to prove that the louse is the carrier of the typhus fever virus, and "probably the only carrier."

Referring to the Plotz-Baehr-Olitsky bacillus, Major Foulerton did not consider that it appeared to have any causative relationship with typhus infection. He, however, considered that it was highly probable that the *Rickettsia prowazeki* organism represents a phase in the evolution of the typhus virus. He referred to Rocha-Lima's work in which it was shown that Rickettsia first appears in the intestinal epithelial cells of the louse on the fourth or fifth day after feeding on an infected patient and in which it appeared that full development is not reached until the eighth or ninth day. "In other words, the virus of typhus fever, after it has attained full activity in man, must pass through a phase of evolution in the louse before it can be transmitted to a fresh human case." Major Foulerton also quoted Nicolle as stating that "the louse cannot transmit the virus until seven days after an infected meal, and does not transmit it after the tenth day." He considers that if Rickettsia represents a phase in the evolution of the virus of typhus fever, it is probable that the infecting parasite is a protozoon.

"It is obvious," he concluded, "that a quarantine of at least twenty-one days is necessary after the last man in an infected unit has been freed from lice—allowing from seven to ten days for the evolution of the virus in the louse, and from six to ten days for the incubation of the virus in man. And even twenty-one days' quarantine from the date of the last case of typhus fever does not cover every possibility. There is the possibility, suggested by a single positive experimental result, of the transmission of the virus from an infected female louse to the ova."

Dr. A. BACOT suggested that, in view of the secretive habits and long life apart from the host of *Cimex lectularius*, this insect would, "supposing it to be implicated," afford a ready explanation for the occasional gaps between primary and subsequent cases.

Dr. Howard BARRIE, as the result of considerable experience of typhus fever in Serbia, considered that there could be no doubt that the body louse is the principal offender. He did not suspect either the flea or bed-bug, and is not convinced that the head-louse is a carrier. He stated that ambulant cases in his experience were not uncommon.

R. P. Cockin.

STARKENSTEIN (E.). **Fleckfieberstudien.**—*Wien. Klin. Woch.* 1917. Feb. 1. Vol. 30. No. 5. pp. 127–136. With 16 charts.

In this paper Starkenstein gives an account of the epidemic of typhus fever which occurred in Russian Poland during the first year of the German occupation. His remarks refer chiefly to the town of Radom, at which place he witnessed the outbreak and was present throughout its whole course.

A statistical table is given showing the racial incidence and death-rate of the disease, and a striking feature displayed by this table is the small number of cases which are shown to have occurred amongst the occupying troops. Only six of these contracted the disease as against 1,328 of the civilian population. Of this latter total 1,166 were Jews—i.e., 87·7 per cent. This incidence among the Jews represents nearly 6 per cent. of the total Jewish population of Radom. Other nationalities suffered to the extent of 0·6 per cent. During the first year of the German occupation of Radom, 3 per cent. of the civilian population died. The death-rate among the Jews was lower than in the other races and the author considers that the vermin-infested dwellings and insanitary surroundings in which they live have conferred upon the Jewish community a certain degree of immunity which is not shared by the remainder of the population. Starkenstein states that "in the houses where one finds lice one also finds typhus."

The course followed by the epidemic was, more or less, normal and the cases increased as the winter set in. With the return of summer, the cases decreased in number. The death-rate however was complicated by tuberculosis in the winter cases and typhoid fever in the summer ones. In the summer the typhus death-rate undoubtedly rose owing to this latter complication and Starkenstein states that whereas in the winter months 6–7 per cent. of typhus cases died, in the summer typhus cases complicated with typhoid had a death-rate of nearly 50 per cent. Starkenstein states that a general survey of the epidemic does not support the generally accepted view that an epidemic becomes milder towards its termination. He found the infection as virulent in the later cases as in the earliest.

The author gives an interesting account of a small epidemic occurring in a community of 160 civilian labourers in which, after the sequestration of 18 typhus cases, the remainder were de-loused and placed in clean quarters. Subsequently three further cases, which were apparently already infected, occurred. There were no further cases, although the men slept together and again became verminous. Starkenstein questions whether this is proof that no contagion exists during the incubation period. He considers that if cases and contacts are thoroughly freed from lice and kept free, there is no necessity for isolation. The knowledge that lice can only be infected from typhus cases during the fever and that infection of the louse does not take place during the incubation and convalescent periods considerably simplifies the question of quarantine.

With reference to diagnosis, Starkenstein states that he considers the " Weil-Felix " reaction to be " absolutely specific in typhus fever," and he found that the reaction failed in none of his cases. As to treatment, he is completely in agreement with those workers who consider the silver colloids as most effective in lowering the temperature and cutting short the course of this disease. He, however, warns other workers as to their injurious and secondary effects, and states that he had observed extensive bleeding from the mouth, stomach and other mucous surfaces and nervous symptoms, after their administration. He recommends that collargol should be given intravenously, in 10 cc. doses of a 2–4 per cent. solution, and repeated daily for several days, in combination with calcium chloride and atophan $\overline{\text{aa}}$ 0·5 gm. and quinine hydrochlor. 0·2 gm.

R. P. C.

Hicks (John R.). **The Modern Hygiene of Typhus Fever—Its Application at the Port of New York.**—*Amer. Jl. Pub. Health.* 1917. July. Vol. 7. No. 7. pp. 628–630.

Hicks regards ordinary "kerosene" as the cheapest and most efficient vermicide; and the following routine procedure, adopted for the disinfection of typhus contacts at the Port of New York, is based upon this fact.

Upon arrival the immigrant contacts are made to march in line to a concrete court, where each one is given an open-mesh cotton bag into which all clothes from valises or trunks are placed. The valises, trunks, shoes, hats, etc., are then transferred to a large sulphur chamber to be disinfected over night. [Eight pounds of sulphur to 1,000 cu. ft.]. The mesh bag and its contents are then taken by the immigrants to a large room, where the latter are lined up and undressed. Their clothes are put into these bags and a metal tag, bearing a distinctive number, is attached. A rubber tag, bearing the same number, is placed round the neck of the owner. Money and other valuables are taken away, and, after being dipped in a solution of 50 per cent. alcohol, placed in an envelope bearing the owner's number. After being stripped the immigrants pass from this room into the shower bath room, where they are given a preliminary bath—using soft soap and hot water. They are then given a petroleum bath, about six ounces per patient being used to destroy all vermin. After this bath, they are dried and given pyjamas and slippers and then fed. Clothes are disinfected by steam under pressure, dried "in vacuo" and returned to the owner. After dressing the immigrants are removed to a clean dormitory.

The inefficacy of sulphur dioxide as a vermicide in the case of pediculi is illustrated by an experiment in which these parasites were exposed to the fumes of this gas [9 pounds to 200 cu. ft.] for 15 hours, at the end of which the pediculi were still alive.

R. P. C.

CUMMING (James G.) & SENFTNER (H. F.). **The Prevention of Endemic Typhus in California.**—*Jl. Amer. Med. Assoc.* 1917. July 14. Vol. 69. No. 2. pp. 98–102. With 2 text-figs.

After a long immunity from typhus fever, there occurred in California, in the summer of 1916, 24 cases—five of which were secondary. The outbreak synchronised with the large influx of Mexican labourers, resulting from the disturbed state of that country. As the case incidence grew from 9 cases during June, July and August to 15 in September, the authorities commenced active measures to prevent its further entry and to stamp out the epidemic. The railway companies co-operated in these measures and established observation camps to which all incoming labourers were sent upon their arrival in the country. They were isolated in these camps for 15 days, thoroughly cleansed and freed from lice and all their belongings disinfected. Strict supervision of the hygienic conditions of the labourers at the section camps was carried out under the supervision of the foremen, who were overlooked by state inspectors.

The result of these energetic measures soon became apparent and the number of cases from October 1 1916 to March 1, 1917 fell to seven, one of which was a secondary case. Of these seven cases, five occurred in October 1916. The remaining two cases were not railway employees. No cases of typhus fever have been reported in California since January 4, 1917 and no cases have occurred amongst railway employees in the railroad camps, since October 25, 1916.

With regard to louse infestation, it was found that, at the beginning of October, 1916, 35 per cent. of the immigrant labourers harboured *Pediculus vestimenti* and 60 per cent. *Pediculus capitis.* At this period measures to free the labourers from lice were instituted and when examined in March 1917, no body lice were observed and only one per cent. were infested with *Pediculus capitis*—thus showing that the measures taken had been effective.

The death-rate was 9·7 per cent.—3 out of 31 cases. Experimental inoculation was carried out with guinea-pigs with the blood of 8 cases. In 5 of these the blood was withdrawn after the crisis and was negative. Three of the animals developed a fever of several days' duration, after an incubation period of 10–12 days. All the strains isolated were carried on to the fourth generation. The authors state that "we have observed that typhus fever produces no distinct pathologic condition in guinea-pigs, such as is found in Rocky Mountain spotted fever."

R. P. C.

OLITSKY (Peter K.), DENZER (Bernard S.) & HUSK (Carlos E). **The Etiology of Typhus exanthematicus in Mexico (Tabardillo).**—*Jl. Infect. Dis.* 1916. Dec. Vol. 19. No. 6. pp. 811–831. With 5 charts.

The authors state that they have been able to establish the identity of the organism of Mexican typhus fever with that of *B. typhi exanthematici.* The proofs rest on the appearance of the colonies, morphology of the bacillus, cultural characterisitcs, fermentation reactions and the agglutination of the organism isolated by typhus immune serum. The work was carried out at Matehuala, Central Mexico, during the epidemic of the winter months of 1915–16, and owing to the disturbed state of the country was attended with very great difficulty. The epidemic was of moderate severity and of the authors' cases 20 per cent. died. [It was whilst engaged on this work that Dr. Husk succumbed to the disease.]

R. P. C.

REDEWELL (Francis H.). **Typhus Fever.**—*Southwestern Med.*—1917. May. Vol. 1. No. 5. pp. 31–39.

A paper read before the Maricopa Medical Society, Arizona, which gives a summary of some of the recent work on typhus fever. The writer is not convinced that artificial immunity can be produced and considers that infection with the comparatively mild " Brill's disease " affords the best protection against the more virulent form of typhus.

R. P. C.

MITCHELL (J. Alexander). i. **Typhus Fever ("Black Fever" or "Mbetalala") in the Cape Province.**—*Med. Jl. S. Africa.* 1917. July. Vol. 12. No. 12. pp. 189–192. *S. African Med. Rec.* 1917. Sept. 8 Vol. 15. No. 17. pp. 259–262.

ii. **Address on Typhus Fever.**—*S. African Med. Rec.* 1917. Aug. 25. Vol. 15. No. 16. pp. 244–248.

Dr. Mitchell states that, for a number of years past, there have been outbreaks of an infectious fever of anomalous type in the Transkei and Border districts of the Cape Province. The attention of the Public Health Department was first called to it during the outbreaks occurring in the Victoria East, Stuttenheim and Kingwilliamstown districts in 1900, but there is evidence that the disease has existed since 1886, and possibly earlier. In this outbreak [of 1900] the disease was at first thought to be plague but was afterwards recognised as the disease known amongst the natives as " Black Fever." The similarity of this disease to typhus fever had long been recognised, but in the nearly invariable absence of the exanthem the diagnosis of typhus was not made.

Since March, 1916, considerable outbreaks of the disease have occurred in the Glen Grey, Queenstown and Kingwilliamstown districts and it has been possible to accommodate a number of patients, both white and coloured, in hospitals where they could be carefully and continuously observed.

The disease follows the typical course of typhus fever "from first to last"—a considerable proportion of the cases showing the typical exanthem.

The author considers that the disease in the later outbreaks is more virulent than in the past, and advises that every means should be used to prevent its spread and eventually to stamp it out. The measures should include the education of the native as to the seriousness of the situation and the necessity which exists for personal cleanliness and hygienic surroundings. Whilst considering lice as the most important transmitting agents of the disease in the Cape Province outbreaks, Dr. Mitchell states that "there are certain facts which go to show that the disease may be conveyed otherwise than by biting insects." He considers that "vermin, dirt and overcrowding are the all-important factors of spread and persistence of typhus."

[Dr. REES, Port Health Officer and District Surgeon of Port Elizabeth, died of typhus fever whilst investigating the last epidemic.]

R. P. C.

COX (F. E.). **A Review of Recent Literature on Typhus Fever and Acute Anterior Poliomyelitis.**—*Commonwealth of Australia Quarantine Service.* Publication No. 13. 79 pp. With 2 coloured plates & 1 map. 1917. Melbourne: Albert J. Mullet, Government Printers.

In this publication Dr. Cox has succeeded in collecting and epitomizing all the recent information regarding these two diseases in a serviceable form. As both typhus fever and acute anterior poliomyelitis are unknown in Australia an effort is being made by Dr. Cox through the officers of the Quarantine Service to prevent their entry. The various measures which have been found effective in combating the disease in typhus infested areas are detailed at length and the measures most suitable for personal, municipal and trench use are given. A map giving the distribution of typhus fever in 1915, and two plates—one of which shows a characteristic typhus rash, the other the typical typhoid rash for comparison—illustrate that portion of the publication which deals with typhus fever.

R. P. C.

BLANC (Jacques). **Contribution à l'étude clinique du typhus exanthématique. Sa prophylaxie dans la guerre actuelle.**—*Ann. d'Hyg. Pub. et de Méd. Légale.* 1917. Jan. 4 Ser. Vol. 27. pp. 5–28. With 2 charts.

A detailed clinical account of typhus fever in which special attention is given to differential diagnosis, treatment and prophylaxis. With reference to the latter the author recommends the establishment of segregation camps behind the Allied lines, in which all German prisoners should be confined for observation for a period of twelve days. As to treatment, the author states that he has found electrargol and collargol of considerable use in combating the fever; and he recommends camphorated oil, in 5–10 cc. doses daily, as a cardiac stimulant. Spartein and adrenalin were also found to be of value in this latter connection.

R. P. C.

WIENER. **Zur Epidemiologie und Prophylaxe des Fleckfiebers.**—*Wien. Klin. Woch.* 1917. Feb. 1. Vol. 30. No. 5. pp. 144–145.

Wiener describes, in this article, the general sanitary measures taken to ensure the health of the prisoners' camp at Kenyermézo and especially to guard against an outbreak of typhus fever. These are stated to have been successful until 303 Serbian prisoners arrived in a state of extreme wretchedness, many of them being sick. Most of these prisoners were suffering with dysentery, some had typhoid fever and others undoubtedly had typhus.

About a month after their arrival the author recognised four cases of undoubted typhus fever, which confirmed the suspicions he had previously formed from post-mortem findings on other cases. The author noted the incubation period of this disease to be about 14 days, though he considers it inconstant and liable to considerable variation.

R. P. C.

i. WIENER (Emerich). **Beitrag zur Fleckfieberdiagnose. Eine vorläufige Mitteilung über die Farbenreaktion des Harnes.** [Typhus Diagnosis. The Colour Reaction of the Urine.]—*Münch. Med. Woch.* 1917. May 22. Vol. 64. No. 21. p. 696.

ii. SYNWOLDT (Jna). **Zur Kritik der Farbenreaktion des Harns als Fleckfieberdiagnostikum. (Bemerkung zur Arbeit von Emerich Wiener,** *Münch. med. Wsch.* 1917).—*Ibid.* Aug. 7. No. 32. pp. 1059–1060.

i. In the first of these papers, Wiener states that, when normal urine is shaken up with ether, an intense blue colour results upon the addition of Jenner stain to which a 1 per 1,000 permanganate solution has been previously added. An intense green colour results when urine from typhus fever patients is used in the reaction. He describes his procedure as follows:—

(1) 4 cc. of urine is mixed with an equal quantity of ether and shaken once or twice. To this mixture is added:—(2) 2 cc. of distilled water, 3 drops of Jenner stain and 10 drops of 1 per 1,000 permanganate solution after thoroughly mixing. The resulting colour is as described above. The author has succeeded in demonstrating the reaction in eight cases of typhus fever and has controlled the test on the urines of 35 cases—19 of which were normal and 16 of which were suffering from diseases other than typhus.

ii. Synwoldt has been able to obtain positive results with the above reaction in cases of typhoid fever, phthisis, tubercular glands, measles, scarlet fever, pernicious anaemia, nephritis and also in healthy persons. He is therefore of opinion that the reaction is not specific for typhus fever and of no diagnostic value in that disease. (Synwoldt had no typhus fever patients).

R. P. C.

WEIL (E.) & SOUCEK (A.). **Die zerebralen Erscheinungen und die meningeale Permeabilität bei Fleckfieber.** [Cerebral Symptoms and Permeability of the Meninges in Typhus.]—*Deut. Med. Woch.* 1917. July 26. Vol. 43. No. 30. pp. 931–933.

Weil and Soucek find that in all cases of typhus fever, subsequent to the fall of the fever, a high degree of meningeal permeability exists. The fact that the condition exists in mild cases of the disease proves, in the opinion of the authors, that this characteristic is as constant a feature of the disease as is the exanthem. The authors are not clear as to whether the condition is a result of a true meningitis or is due to some alteration in, or damage to, the meningeal vessels. FUCHS is quoted as stating that in cases of typhus fever which exhibit marked nervous symptoms the cerebrospinal fluid gives a positive Weil-Felix reaction.

R. P. C.

SCHIFF (Friedrich). **Das Blutbild bei Fleckfieber und seine praktische Bedeutung.** [The Blood Picture in Typhus.]—*Deut. Med. Woch.* 1917. Sept. 20 & 27. Vol. 43. Nos. 38, 39. pp. 1193–1195: 1229–1230. With 9 charts.

In these papers Schiff describes the blood changes which he observed in his examination of a series of typhus fever patients. About sixty cases of the disease were under observation and, of these, thirty were examined daily. The changes are described as typical and chiefly involved the leucocytes.

In the first days of the disease the total leucocyte count is diminished —the other constituents remain normal. From this period onwards the leucocytes increase from day to day, and Schiff considers this as an indication that inflammatory changes are taking place in the bone marrow and lymphoid tissues. At the end of the first week the leucocyte count is markedly increased and this increase is chiefly due to the invasion of the blood by young neutrophile forms, with rod-shaped nuclei, which account for 50–60 per cent. of the total count. At this period, eosinophiles disappear from the blood. At the end of the first week all typhus cases have exactly the same blood picture.

During the second week of the illness the leucocytes increase still more, the increase being caused by a considerable addition of large mononuclears and the appearance of inflammatory plasma cells and other atypical forms. The neutrophile forms, described above, undergo a considerable decrease and at this period are but 30–20 per cent. of the total count. At this stage the differences between the various cases are great. Schiff divides the cases into two types:—(a) Those showing marked leucocytosis with a relative neutropenia, increase of large mononuclears and the atypical forms. (b) Those with a moderate leucocytosis and having a slight or no increase of large mononuclears.

The first of these types was fairly abundantly represented in the author's cases—but transition types were also observed. In the later days of the disease, the blood picture gradually approaches the normal and eosinophiles re-appear. The condition always disappears after the illness.

Schiff considers that the blood picture in conjunction with the clinical symptoms is of great diagnostic value, especially so before the appearance of the exanthem.

R. P. C.

Daniélopolu (D.). **Des associations streptococciques dans le typhus exanthématique.**—*Presse Méd.* 1917. July 12. Vol 25. No. 39. pp. 403–404.

Daniélopolu calls attention, in this paper, to the relative frequency with which typhus fever is complicated by various streptococcal infections. These usually make their appearance either in the terminal stages of the fever or during convalescence, and he observed pleural suppuration, parotitis, otitis, erysipelas or the development of abscesses at the site of injections in 40 cases out of his series of 200. Although frequently the infection was found to be a mixed one, yet in two cases of pleural suppuration he isolated streptococci in pure culture. With regard to erysipelas the author states that this is not an uncommon complication and he met with it on nine occasions; of these seven died.

The author has met with 20 cases which developed abscesses at the site of injection and his experience has been confirmed by various colleagues. At first this was considered to be due to faulty technique but extreme care in sterilization and personal supervision led to no better results. This, added to the fact that the abscesses only occurred in some cases and usually appeared some time after the injection, convinced the author that the cause of the trouble was not external, and confirmed his belief that these various suppurative conditions are due to the circulation in the blood stream of a streptococcal infection.

He states that streptococcal complications occurring in the course of typhus fever are less serious than when such infections occur at the onset of the disease.

R. P. C.

Potel (René). **Observations cliniques et étiologiques sur les cas de typhus soignés à l'hôpital permanent de la marine de Sidi-Abdallah. Action du sérum antiexanthématique.**—*Arch. Méd. et Pharm. Nav.* 1917. June, July. Vol. 103, 104. Nos. 6, 1. pp. 440–447; 14–53. With 32 charts.

During an epidemic of typhus fever at Sidi-Abdallah [Tunis], during the period February-April, 1916, the author used Nicolle's anti-typhus serum [see this *Bulletin*, Vol. 8, p. 474] for the treatment of the most severe cases with marked success. The epidemic was practically confined to Serbian soldiers and the members of the French hospital ships which were evacuating the Serbian sick from Albania to Tunis. Amongst the Serbians the disease usually showed marked benignity—without exanthem or fever—and its existence was unrecognized until cases began to appear among the French hospital orderlies. The total number of cases was 528, of which 486 were Serbians and 42 French. Of these, 31 were treated with Nicolle's anti-typhus serum—24 French and 7 Serbians—these cases being the most severe of those which occurred after the institution of the serum treatment. The whole of the cases showed marked improvement of their general condition after injection, especially of the nervous symptoms. The action on the temperature and duration of the illness was also favourable, being particularly marked in the case of the Serbians who usually responded to the first injection. In six cases, the temperature abruptly fell after one or two injections and the serum appeared to have the effect of cutting short the disease in its course. In many of the cases the disease was aborted from the 6th to the 12th day, and the average duration of the course of the disease was 11·61 days. Only one death occurred in this series, due to a general septicaemia supervening on an injection of camphorated oil. No other complications were observed.

The author recommends that the injections should be commenced as early as possible, even in doubtful cases—as no ill-effects have been noted. The method of administration recommended is by subcutaneous injection and the dose 10–20 cc. per day, repeated for 8–10 days in severe cases.

The author gives an account of the various measures taken to stamp out the epidemic, which should be consulted by those interested.

R. P. C.

ORTICONI (A.). **Essais de sérothérapie du typhus exanthématique par injections intrarachidiennes de sérum de convalescents.**—*Bull. e Mém. Soc. Méd. Hôpit. de Paris.* 1917. July 12. Vol. 33. 3 Ser. No. 23–24. pp. 827–829.

In view of the unsatisfactory results attending the treatment of typhus fever by subcutaneous and intravenous injections of anti-typhus serum and of the fact that the nervous symptoms are so characteristic of the disease, the author has carried out treatment by means of intra-spinal (intra-arachnoid) injections in eight cases in which the nervous symptoms were unusually severe. The anti-typhus serum injected was obtained from convalescents—6–12 days after defervescence—and the usual technique was employed as to lumbar puncture. The injection had a marked effect on the general condition of the patient, the pulse and the nervous symptoms—irrespective of the period of the disease at which it was administered.

Of the eight cases treated by this method six recovered after injection of 20 cc. of the immune serum. All showed marked general improvement, the pulse became slower and more regular, facial congestion and conjunctivitis disappeared and the six patients who recovered made a normal defervescence on the 14th–16th day. One died of erysipelas during convalescence. The serum injected did not appear to have any effect on the length of the disease or the temperature curve.

Orticoni recommends two injections of 20–25 cc., at an interval of 24 hours, as early as possible after the appearance of the exanthem. If given whilst marked nervous symptoms are not obvious the author considers that the injection may prevent their appearance. In any case the injection would improve the general condition of the patient and promote sleep.

Orticoni states that, in view of the great difficulties attending the preparation and obtaining of the immune serum, he realizes this serotherapy cannot be generally used, but he considers that when available the method he advocates is preferable to either the subcutaneous or intravenous mode of administration. The work was carried out in Roumania.

R. P. C.

Baehr (George). Agglutination in Typhus Fever.—*Jl. Infect. Dis.* 1917. July. Vol. 21. No. 1. pp. 21–27. With 1 fig.

In 1915, Olitsky recorded that specific agglutinins, precipitins, complement-fixation bodies and opsonins for *B. typhi exanthematici* were regularly present in the blood of patients convalescent from typhus fever. He also stated that "agglutinins (and other antibodies) are usually absent at the height of the disease, but increase in amount at the crisis, until they reach their maximum well along in the apyrexial period." (See fig.)

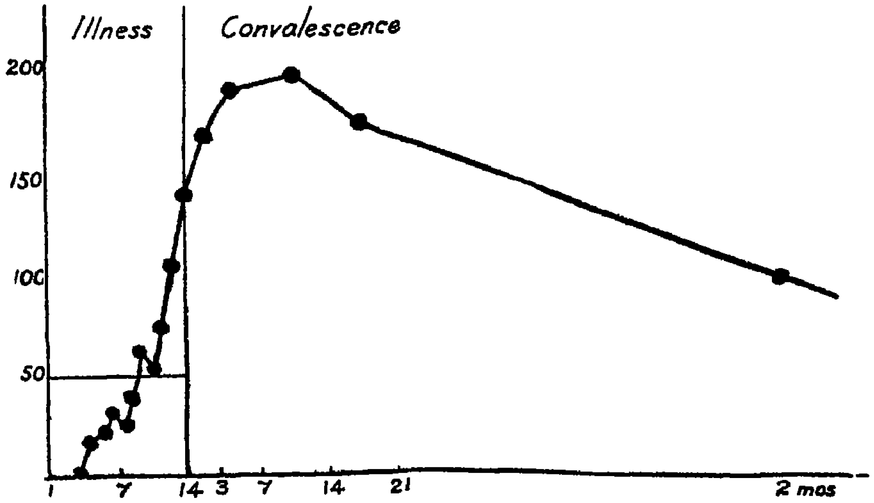

Fig. 1.—Agglutinin Curve in Typhus Fever.

[Reproduced by permission from the *Journal of Infectious Diseases.*]

During his investigations in Volhynia, during the first three months of 1916, Baehr has been able to confirm Olitsky's observations on more abundant material and "to ascertain in more detail the course of the development of antibodies in this disease." In preparing the tests, the microscopic method was used: as "the relatively slow growth of the organism and its tendency to clump on standing made the macroscopic method of agglutination impracticable." Readings were made after one hour, at room temperature, and only definite agglutination into clumps was considered positive. Altogether, 271 agglutination tests were made on the serum of 100 persons with typhus fever. In 46 of these cases, from three to eight examinations were made during the course of the disease and early convalescence. The remainder were examined on one or two occasions only.

Agglutinins were demonstrable in 43 out of the 46 cases studied systematically (i.e., 93 per cent.); 28 non-typhus cases were examined as controls and were uniformly negative. No agglutinins were present in three of the typhus fever cases, examined four, five and six times respectively, during the course of the disease and early convalescence. In less than a third of the cases, agglutinins may be demonstrated in the blood at the end of the first week of the disease. During the course of the second week over two-thirds of the cases become positive and in early convalescence 97 per cent. of the cases gave positive results. Baehr suggests that the agglutination test is of diagnostic value in the latter half of the disease and he succeeded in proving its value in mild, atypical and ambulatory cases. These latter cases, which Baehr states are common in Volhynia, "especially among the Russian peasantry," are "undoubtedly responsible for the spread of the disease."

Baehr was also able to confirm OLITSKY's observation that when a blood culture, made during the disease, was negative, "the serologic examination, at that time, usually showed a high content of antibodies." "This observation would appear to indicate that the early appearance of agglutinins is an evidence of resistance to the disease, and is therefore of prognostic value. Unfortunately, however, the mortality in typhus fever is in part due to complications, chiefly pneumonia, erysipelas, and other infections."

The lighting up of the Widal reaction during the course of typhus fever, in persons who had previously suffered from typhoid fever or been vaccinated against it, was frequently observed both by the author and the German and Austro-Hungarian army bacteriologists in Russian Poland and Volhynia.

The results of agglutination tests made by Baehr at different stages of the disease, are given in the following table :—

Days of disease.	Number of examinations.	Number positive.	Percentage positive.
1–4	13	0	0
5–7	26	8	31
8–11	49	31	63
11–15	49	36	72
Convalescence.			
First week	53	47	88
Second week	26	25	97
Third week	20	18	90
After 2 months ..	13	10	77
After 3 months ..	11	6	55
After 10–14 months..	11	3	27

R. P. C.

BAEHR (George). **Development of Antibodies for** *Bacillus typhi-exanthematici* **in Typhus Fever Contacts.**—*Ibid.* Aug. No. 2. pp. 132–140.

Baehr states that individuals exposed to typhus fever infection may possess specific antibodies in their serum without having had any clinical manifestations of the disease. This paper records 20 such cases, each of which had been in intimate contact, recently, with typhus fever infection. Of these cases three, after their exposure to infection, had suffered from "vague general symptoms indistinguishable from an influenza." All the others had been well. Complement fixation tests were carried out with a typhus antigen, consisting of a clear Berkefeld filtrate of a 24 hours autolysate of *Bacillus typhi-exanthematici* previously killed by heating at 60° C. for one hour. This antigen, Baehr states, is absolutely specific and gave positive results only with the serum of typhus fever convalescents and in the group of 20 cases noted above. Uniformly negative results were obtained in 150 control cases. These findings lead Baehr to assume that, at the time of the exposure to infection, the contacts had actually been infected with the bacteria. but in quantities insufficient to induce clinical manifestations.

R. P. C.

PANETH (L.). **Agglutinations-Studien bei Fleckfieber.**—*Arch. f. Hyg.* 1916. Vol. 86. No 2 & 3. pp. 63–108. With 58 charts.

Working at one of the Austrian field laboratories, Paneth has investigated the agglutination curves for all the organisms which play a part in typhus fever. These investigations were carried out on about 300 cases of the disease and the development of the agglutinins of *B coli*, *B. proteus*, *B. typhosus* and *B. typhi exanthematici* were examined. Paneth finds that the agglutinins of *B. coli*, *B. proteus* and *B. typhosus* make their appearance in the blood in the early part of the second week of the disease and increase steadily until they reach their maximum height at about the time that the temperature descends to the normal level. Within a few weeks they have disappeared completely from the blood. The agglutinins of *B. typhi exanthematici* also make their appearance in the early part of the second week of the disease, but develop more slowly and do not attain their maximum until the second week of convalescence. They then persist for several months. The curves for the formation of the agglutinins in the case of *B. coli*, *B. proteus* and *B. typhosus* are practically identical and differ markedly from that of *B. typhi exanthematici.*

R. P. C.

McCOY (G. W.) & NEILL (M. H.). **Immunization against Typhus Fever. A Report of an Unsuccessful Attempt to Immunize Monkeys against Typhus Infection by Cultures of *B. typhi exanthematici* (Plotz).**—*Public Health Rep.* 1917. June 1. Vol. 32. No. 22. pp. 841–848. With 4 charts.

McCoy and Neill conclude, as a result of the above experiments, that bacterial vaccines prepared from cultures of *B. typhi exanthematici* do not protect monkeys against typhus infection. Six test monkeys were used and each received, subcutaneously, an injection of 1,000,000,000 organisms. In half, the organisms were given alive; in the other half the bacilli had been killed by exposure for one hour to 60° C. before use. No reaction followed. The subsequent injection, intraperitoneally, of a test dose of typhus virus resulted in all the monkeys exhibiting temperature curves characteristic of typhus fever infection. Typhus immune animals and non-vaccinated animals were used as controls.

R. P. C.

OLITSKY (Peter K.). **Immunologic Studies in Typhus exanthematicus.** —*Jl. Immunol.* 1917. June. Vol. 2. No. 4. pp. 363–373.

An account of the relationship of *B. typhi-exanthematici* to typhus fever is given in which the author states that the organism has now been isolated from the blood of typhus fever patients in the United States, Serbia, Bulgaria, Russia and Mexico, from the blood and spleens of typhus infected animals and from typhus infected lice. Identical agglutinins were found to be present in both endemic (New York) cases and epidemic (Balkan) cases, and Olitsky states that convalescent (immune) serum from one type of case agglutinated organisms isolated from the other. These agglutinins are also found in the serum of experimentally infected animals, with the exception of the guinea-pig.

In 43 typhus fever patients the agglutinins were found to be present in the serum, after the crisis, in 92 per cent., and rarely during the height of the fever or on the day of the crisis. These antibodies persisted for 5–6 months after the crisis.

The maximum titre for the agglutinins was found to be on the seventh or eighth day after the crisis. The agglutinins are regarded as specific and organisms other than the typhus bacillus are not agglutinated by typhus fever serum, with the exception of a strain of the Proteus bacillus. In this latter case the reaction rapidly disappears after the crisis and is always most marked during the course of the fever. "It is the persistence of the antibodies which characterises the causal agent of a disease."

Working with the protein of the typhus bacillus as antigen Olitsky was able to demonstrate that the formation of complement fixation bodies runs parallel to that of the agglutinins. They are capable of demonstration somewhat later and disappear sooner. Precipitin tests were carried out by using a polyvalent precipitogen of the typhus bacillus and the curve of formation corresponded with those of the agglutinins and complement fixation bodies.

Immune opsonins were determined not only in serum from typhus fever cases but also in the serum from animals immunized by repeated injections of the bacteria. Their formation agreed with that of the other antibodies. Immunized guinea-pigs, which showed none of the other antibodies, possessed these regularly. The writer also deals with SELLARD's claims and the paper should be consulted by those interested in this discussion.

R. P. C.

OLITSKY (Peter K.), DENZER (Bernard S.) & HUSK (Carlos E.). **The Isolation of the *Bacillus typhi-exanthematici* from the Body Louse.** —*Jl. Amer. Med. Assoc.* 1917. Apr. 21. Vol. 68. No. 16. pp. 1165–1168.

This paper gives an account of the successful cultivation of *B. typhi-exanthematici* from infected body lice. Altogether six series of lice from five different patients were employed. The lice were removed from typhus patients between the 12th day of illness and the 4th day after the crisis. "From practically all these lice, the *Bacillus typhi-exanthematici* was isolated, sometimes in pure culture, in numbers varying from two colonies to an innumerable number of colonies." The medium used was a 0·5–2 per cent. glucose agar to which a third the volume of rich ascitic fluid was added.

Referring to the variability of *B. typhi-exanthematici* to Gram's stain, the authors are of opinion that the response to the stain varies with the virulence of the organism.

R. P. C.

OTTO (R.) & DIETRICH. **Beiträge zur "Rickettsien"-Frage.** [The Rickettsia Question.]—*Deut. Med. Woch.* 1917. May 10. Vol. 43. No. 19. pp. 577–580. With 4 figs & 3 charts.

The authors of this paper give details of the experiments they have made with a view to determining the rôle played by *Rickettsia* in typhus fever. Lice enclosed in a small box, provided with a fenestrated cover over which a layer of fine gauze was stretched, were imposed on the under surface of the arm or inner side of the thigh of typhus fever patients at various stages of the disease and for varying periods. Of the whole number of lice 55 per cent. were dead upon removal. Of the remainder, 20 per cent. were found to be infected with *Rickettsia* and 25 per cent. did not harbour the parasite in sufficient number to be diagnosed. The authors state that these numbers cover the total number of lice experimented with and add that of those lice which had fed on the patient for a sufficiently long period, 70–80 per cent. were infected. The best results were obtained when the lice were imposed on the 5th–7th day of the fever and permitted to feed during a period of 7–8 days. Of the lice placed on the patient towards the end of the disease only a few became infected—4–5 per cent. on the 12th day, and all were negative after the decline of the fever.

The first infected louse was found on the 4th day. The examination of the gut contents of the infected lice confirmed the findings of other workers, with regard to the numbers, form and staining properties of the organisms observed. In addition to the usual bi-polar staining organisms, they observed short rod-like and long filamentous forms. The thread-like forms were noted in the case of a louse taken from a patient on the 4th day and were absent in lice which had fed for nine days. The authors suggest that these forms may be transition stages in the life-history of one parasite.

Experiments made to determine whether the louse can transmit the virus to its young were all negative. The authors succeeded in infecting lice with *Rickettsia* by feeding them on a case of typhus *sine exanthem.* The serum of this patient gave a positive Weil-Felix reaction.

Attempts to transmit the infection to guinea-pigs, by the injection of the gut contents of infected lice, were only successful in a small percentage of cases [three are given]. The same changes and appearances were noted as occur in guinea-pigs inoculated with the blood of typhus fever patients. Agglutination experiments were also attempted by bringing the serum to be tested into contact with an emulsion of the gut contents of infected lice.

The paper should be consulted by those interested. R. P. C.

DA ROCHA-LIMA (H.). **Zum Nachweis der *Rickettsia Prowazeki* bei Fleckfieberkranken.** [Demonstration of *R. p.* in Typhus.]—*Münch. Med. Woch.* 1917. Jan. 2. Vol. 64. No. 1. pp. 33–35.

Da Rocha-Lima states that, whilst it is not conclusively proved that typhus fever is caused by *Rickettsia prowazeki*, certain observers have noted organisms in this disease which are not dissimilar to it. RICKETTS & WILDER, GAVINO & GIRARD and MCCAMPBELL found it in the blood, von PROWAZEK in the leucocytes and da Rocha-Lima in the blood, in smears and in sections.

He considers that HANSER's observations on the organism found by him in skin-sections from cases of typhus fever are incorrect and the organism is not Rickettsia. The organism described by TOEPFER from typhus fever cases, he considers, is not unlike the bacterium described by RABINOWITSCH in 1909.

Da Rocha-Lima suggests the establishment of a central bureau to which preparations illustrating new or important work on typhus fever should be sent, and where their true value could be appraised.

R. P. C.

i. VITEČEK (Vladimir). **Die klinische Bedeutung der Weil-Felixschen Reaktion.** [Clinical Significance of the Weil-Felix Reaction.]—*Wien. Klin. Woch.* 1917. Aug. 2. Vol. 30. No. 31. pp. 967-972. With 8 charts.

ii. STERLING (Stefan) & STERLING (Kazimiera). **Beitrag zur Weil-Felixschen Reaktion.**—*Ibid.* pp. 972–974. With 5 charts.

i. As the result of exhaustive experiments with the Weil-Felix reaction carried out on 87 cases of typical typhoid, 15 cases of paratyphoid, one case of atypical typhoid and one atypical case of paratyphoid, in addition to 137 cases of various other diseases—dysentery, scarlatina, malaria, small pox, erysipelas, nephritis, etc., and 151 healthy controls, the author considers a strong positive reaction, at 1 : 50 or higher titre, to be absolutely specific and diagnostic of typhus. Of the controls 8·43 per cent. gave weak positive reactions in dilutions of 1 : 25, rarely 1 : 50, whilst of the 87 typhoids 8·04 per cent. gave weak reactions at 1 : 25 and 1 : 50. The titre attained in positive typhus cases is usually high and rarely below 1 : 200. The usual titre is 1 : 1,000. The author cites two cases in which the reaction was positive six months after the illness and one in which it persisted for over a year.

Strains of X_1, X_2 and X_{19} were used in this work and Vitecek recommends X_{19} as being more sensitive and giving a higher titre than the other strains.

ii. Using strains of X_{19} these authors carried out the Weil-Felix reaction on 555 cases, of which 311 were clinically typhus fever. The reaction was positive in 96 per cent. of the typhus cases and they consider the test of specific value at the end of the first and beginning of the second week of fever. Two cases of typhoid fever (of a total of 128 cases) agglutinated X_{19} at 1 : 200. For diagnostic purposes Sterling & Sterling recommend that a positive reaction at 1 : 200 should be obtained, as typhoid frequently gives a positive reaction at 1 : 100. The highest titre in typhus is obtained towards the end of the second week of the disease and declines gradually after this period.

R. P. C.

BALLNER (F.) & FINGER (A.). **Ueber die Weil-Felixsche Proteusreaktion mit dem Harne Fleckfieberkranker.** [The Weil-Felix Reaction with the Urine.]—*Wien. Klin. Woch.* 1917. Aug. 2. Vol 30. No. 31. pp. 966–967.

Working with a strain of X_{19} Ballner and Finger state that they were able to obtain a positive Weil-Felix reaction with the urines of typhus fever patients when this disease was complicated by damage to the kidneys and albumen was present in the urine. This phenomenon was observed in 23 cases of typhus complicated by nephritis, and the Weil-Felix reaction with the patients' serum was, without exception, positive In 19 cases of typhus, without this complication, the Weil-Felix reaction with the urine failed entirely, although the serum of all these cases gave a positive result. Sixteen control cases of nephritis, without typhus, were negative.

R. P. C.

DADEJ (K.) & KRAHELSKA (M.). i. **Die Kurve der Weil-Felixschen Reaktion.**—*Münch. Med. Woch.* 1917. Oct. 16. Vol. 64. No. 42. pp. 1379–1381. With 16 charts.

ii. **Ueber die Weil-Felixsche Reaktion.**—*Ibid.* Oct. 23. No. 43. pp. 1408–1409.

In these papers Dadej and Krahelska state that, in their experience, the Weil-Felix reaction may vary considerably in different groups of cases. In the winter of 1916, working at Bilgorai [Poland] during a small epidemic of typhus fever they examined the serum of 65 typhus patients with this test. Sixty-three gave a positive reaction; the other two failed to give the reaction although clinically they were typical cases of the disease. Of the positive cases, 93 per cent. agglutinated the organisms at dilutions between 1 : 50 and 1 : 1,000 and 3 per cent. worked at dilutions as high as 1 : 1,500–1 : 3,000. The appearance of a clearly positive reaction (1 : 50 or higher titre) preceded the crisis in 75 per cent. of the cases. The remaining 25 per cent. gave the reaction after the crisis or during the course of the third week. The authors call attention to the great variation which is shown by individual sera with regard to the height of the agglutination titre at its first appearance and also as to the period during which this property persists.

Working at Piaski (near Lublin), during the spring, with the sera of 20 typhus fever patients, Dadej and Krahelska found the average titres considerably higher and 95 per cent. showed titres of 1 : 500 or over. In 5 per cent. of the cases the titre was between 1 : 100 and 1 : 500, in 30 per cent. between 1 : 500 and 1 : 1,000, in 40 per cent. between 1 : 1,000 and 1 : 1,500, in 20 per cent. between 1 : 1,500 and 1 : 10,000 and in 5 per cent. over 1 : 10,000. One case agglutinated at a dilution of 1 : 32,000. In the Piaski cases the reaction occurred earlier than in the Bilgorai cases, 90 per cent. exhibiting it before the crisis.

R. P. C.

SCHUERER (J.) & STERN (W.). **Zur serologischen Diagnose des Fleckfiebers.**—*Münch. Med. Woch.* 1917. July 3. Vol. 64. No. 27. pp. 886–887.

As a result of their researches, on the serological diagnosis of typhus fever, the authors state the following as their conclusions :—

1. Agglutination of Proteus strain X_{19} in a serum dilution of 1 : 50 is positive proof of typhus fever.

2. In the event of a living culture not being available, the test can be carried out with a culture to which a 1 per cent. solution of formalin has been added. Such a culture can be kept for weeks.

3. "Contacts" of typhus fever cases which showed, for short periods, some degree of fever, all gave a negative Weil-Felix reaction. The authors consider that this proves that abortive or mild types of this disease do not occur.

These investigations were carried out with three dilutions only—1 : 25, 1 : 50 and 1 : 100—and in the case of no other disease than typhus was an agglutination obtained in dilutions as high as 1 : 50. Of 58 typhus cases examined 54 were positive, two agglutinated at a dilution of 1 : 25 and two were completely negative. One of the negative cases was a convalescent of 28 days. Sixty non-typhus cases gave uniformly negative results.

R. P. C.

ZEISS (Heinz). **Zur Aetiologie des Fleckfiebers.**—*Deut. Med. Woch.* 1917. Sept. 27. Vol. 43. No. 39. p. 1227.

Zeiss claims to have been successful in isolating an organism of the Proteus group, which resembles X_{19} in its agglutinating properties, from the living subject in 19 cases of typhus fever. On 18 occasions it was isolated from the blood and once from the pus of a post-typhus abscess. It was not found in any case after the fortieth day from the commencement of the fever. All the organisms resembled X_{19} in their properties and no organism resembling X_2 is recorded. The work was carried out in Asia Minor between February and April, 1917. Zeiss states that FELIX and his collaborator had been dependent for their strains upon post-mortem typhus material and had not succeeded in isolating them from the living patients.

A table is given which shows that the majority of the successful cultures was made before the twentieth day. All control non-typhus cases were negative.

R. P. C.

i. NEUBER (Bruno). **Ein Fleckfieberdiagnostikum.**—*Münch. Med. Woch.* 1917. May 22. Vol. 64. No. 21. pp. 695–696.

ii. CSÉPAI (Carl). **Ein Fleckfieberdiagnostikum.**—*Ibid.* June 26. No. 26. p. 863.

iii. BIEN & SONTAG (F.). **Herstellung eines haltbaren Fleckfieberdiagnostikums.**—*Ibid.* Oct. 23. No. 43. p. 1409.

The production of a permanent means for carrying out the agglutination reaction in typhus fever is dealt with in each of the above papers. Neuber suggests that cultures of X_{19}, killed by the addition of a 1 per cent. solution of phenol, would furnish such a means. Csépai uses heat for the same purpose and claims to have had successful results from the use of cultures killed in this manner. Bien and Sontag consider both the above methods to be unsatisfactory and suggest the use of cultures of X_{19} killed with alcohol after preliminary treatment with a 0·5 per cent. solution of phenol.

R. P. C.

Neill (M. H.). **Experimental Typhus Fever in Guinea Pigs. A Description of a Scrotal Lesion in Guinea Pigs infected with Mexican Typhus.**—*Public Health Rep.* 1917. July 13. Vol. 32. No. 28. pp. 1105–1108.

The striking similarity of typhus fever and Rocky Mountain spotted fever led the writer to examine male guinea-pigs, infected with Mexican typhus virus, for scrotal lesions similar to those which are uniformly present in Rocky Mountain spotted fever. The guinea-pigs were inoculated directly from human cases of the disease or from guinea-pigs and monkeys in which the virus was being propagated. They were inoculated intraperitoneally and killed at the height of the febrile reaction. Of 37 guinea-pigs, 26 showed scrotal lesions. The lesions are described by the author as follows :—

"The skin of the scrotum looks apparently normal, but if it be carefully dissected from the tissues immediately beneath, definite haemorrhages appear in the cremasteric fascia, just external to the parietal laminae of the tunica vaginalis. If these structures be incised and the testicle and epididymis exposed, haemorrhages of a similar nature will be noted immediately beneath the visceral laminae of the tunica vaginalis. The extent of these haemorrhages varies, from a few minute petechiae to nearly complete envelopment of the testicles by haemorrhagic areas. If the animal be examined at the height of the process, i.e., one to two days after the swelling is first noted, the lesions above described are indistinguishable in their gross appearances from the lesions of Rocky Mountain spotted fever at the same stage of development of the disease, that is, one or two days after the swelling of the scrotum is first noted . . . . the lesions of typhus fever rapidly clear up and soon the animal is as well as ever."

Frankel, Aschoff and Poindecker have described certain histological changes in typhus fever, especially as regards the exanthem, which the writer has been able to confirm. All these workers "describe as characteristic, lesions of the smaller arteries, consisting of necrosis of the intima and the perivascular accumulation of cells among which, as in spotted fever, the mononuclear elements predominate."

The writer considers it desirable to state that the non-identity of typhus fever and Rocky Mountain spotted fever has "apparently been thoroughly established by immunological studies."

R. P. C.

Nicolle (Charles). **Cent passages successifs du virus exanthématique par cobayes.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 526–528. With 2 charts.

Nicolle announces in this paper that a Moroccan strain of typhus fever, with which guinea-pigs were first inoculated on May 25th 1914, has now been subinoculated a hundred times and still remains as virulent for monkeys and guinea-pigs as when first isolated. The virus thus obtained is employed by him in the preparation of a curative serum for typhus fever.

R. P. C.

Plotz (Harry), Olitsky (Peter K.) & Baehr (George). **Studies in Prophylactic Immunization with *Bacillus typhi-exanthematici*.**—*Jl. Amer. Med. Assoc.* 1916. Nov. 25. Vol. 67. No. 22. pp. 1597–1598.

This is a preliminary note on the result of anti-typhus vaccination experiments carried out in Russia and the Balkans. Altogether 8,420 persons, mostly members of hospital and sanitary units, were vaccinated against typhus—an attempt being made to include only those persons most exposed to infection. Of this number six developed the disease during the four months of the epidemic. The authors conclude that the vaccine is capable of appreciably reducing the incidence of the disease, but not that it confers absolute immunity.

The vaccine used consisted of a suspension of fifteen strains of *B. typhi-exanthematici*, in physiological sodium chloride solution, which had been subjected to a temperature of 58°–60° C. for ½–1 hour. After being tested anaerobically and aerobically, as to sterility, it was diluted so that each cubic centimetre contained two billion organisms, and 0·5 per cent. phenol was added. Three injections—0·5 cc., 1 cc. and 1 cc.—were given at 5–6 day intervals.

R. P. C.

ROBERTSON (Muriel). **Typhus Fever: An Experiment on Vaccination with a Coccus derived from Human Cases.**—*Jl. Path. & Bact.* **1917.** Apr. Vol. 21. No. 2. pp. 173–183. With 12 charts.

This paper describes two series of experiments made by Miss Robertson in an attempt to vaccinate against the virus of typhus fever. The organism used for the vaccine was the coccus isolated by PENFOLD, from the blood and urine of two typhus fever patients, during the Belfast outbreak in July, 1914. The animals used for the experimental work were monkeys and controls were used in each series. The typhus fever blood was obtained from human cases at Kildysart, co. Clare. After preliminary vaccination with Penfold's coccus the animals were inoculated intraperitoneally with from 2½–4 cc. of citrated typhus fever blood. Miss Robertson found that the preliminary vaccination had no protective value and considers that "no evidence was obtained of a causal connection between the coccus found in the blood and the clinical condition known as typhus fever." Miss Robertson succeeded in isolating the same coccus from two further human cases. The paper is illustrated by numerous charts.

R. P. C.

KALA AZAR.

CORNWALL (J. W.) & MENON (T. Kesava). **A Contribution to the Study of Kala-Azar (III).**—*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 672–687.

For the review of the first two parts of this contribution see this *Bulletin*, Vol. 8, p. 403 and Vol. 9, p. 229. The third part now under consideration is divided into seven sections as follows :—

"1. The Relation between Flagellates and Bacteria.
"2. Can Bugs regurgitate Bacteria ?
"3. History of a Monkey inoculated with *L. tropica.*
4. Sixth Negative Transmission Experiment.
"5. Eighth Consecutive Successful Culture of *L. donovani* from the Peripheral Blood.
"6. Culture of *Leishmania* in NNN Medium prepared with Blood other than that of the Rabbit.
"7. Summary."

1. Assuming that flagellation of *L. donovani* and *L. tropica* cannot occur in the stomach of a bug containing abundant bacteria the number of species which can function as hosts is limited. Experiments were therefore made to elucidate the effect of bacteria on flagellates, especially Leishmania flagellates. Flagellates of *L. donovani* and *L. tropica* continued to multiply in NNN culture tubes to which the soluble products of bacterial metabolism had been added. Other cultures to which autolysed bodies of dead bacteria were added also shewed no inhibition of growth. It is concluded that the destruction of flagellates which takes place in cultures contaminated by bacteria is primarily due to exhaustion of the available nutriment. *L. donovani* flagellates are definitely more susceptible to the effect of bacterial contamination than *L. tropica.* Comparable to the destruction which takes place *in vitro* is that which is found quickly to occur when bugs are fed on bacterially contaminated citrated blood plus Leishmania flagellates.

The statement made in a previous contribution [*loc. cit.* p. 229] that viable forms of *L. donovani* and *L. tropica* are apparently not passed in the faeces of *Cimex rotundatus* is now modified, the authors having found several active *L. donovani* flagellates in the intestine and two active flagellates in the rectum of a bug which had been fed on July 29 on sterile citrated rabbit blood containing *L. donovani* flagellates, and subsequently re-fed on August 2, 7, and 12, on sterile citrated rabbit blood only. The dissection was made on August 16. *Cimex rotundatus* was fed upon herpetomonads obtained from Lygeid bugs and added to citrated rabbits' blood. The herpetomonads could not be freed from bacteria. In contrast to what takes place with the flagellates of *L. donovani* and *L. tropica* it was found that large numbers of the parasites survived to reach the rectum.

2. This investigation was made on account of its bearing upon the possible transmission of leishmania. Experiments made by other workers are discussed. The authors experimented with *Staphylococcus citreus*, *Staphylococcus albus*, and *B. pyocyaneus.*

"*Cimex rotundatus* frequently succumbs after a feed infected with bacteria. If it survive, the infecting organism sometimes is, and sometimes is not, recoverable by culture from its stomach. In no case did infected bugs prove to be able to infect a sterile culture medium in the act of feeding. The transmission of bacterial infections in nature by bugs in the act of biting is probably a rare occurrence."

3. A monkey (*Macacus sinicus*) was successfully inoculated by rubbing into a scarified area of skin a primary culture of flagellates from a human Oriental Sore. Cultures made at intervals from the blood on NNN tubes proved to be sterile. Bugs, fed at intervals on the animal, failed to become infected. A white rat and a rabbit were inoculated with negative result with material from the lesion at a time when it contained numerous parasites. The inoculations were made both by skin scarification and rubbing, and by subcutaneous infection. *L. donovani* and *L. tropica* flagellates grew readily on NNN tubes prepared with the monkey's blood after recovery from the Oriental Sore. It is concluded that the animal suffered no systemic infection.

4. Bugs were fed on sterile citrated rabbit blood containing *L. donovani* flagellates. They were re-fed on sterile citrated rabbit blood, four, nine, and fourteen days later, these feeds being then distributed in NNN tubes. The result, as in five previous experiments was negative, though the bugs were proved after each feed to be still infected.

5. The patient had not suffered from pyrexia for three weeks at the time the culture was made, shewing that flagellates may be cultivated from the peripheral blood even during apyrexial periods. The blood was distributed in 12 NNN tubes. Eight of these remained sterile. "Not less than ten or twelve culture tubes should be used, otherwise parasites, if scanty, may not be secured."

6. "Both *L. donovani* and *L. tropica* flagellates grow well in subculture in NNN medium prepared with the blood of *Macacus sinicus*."

E. J. Wyler.

Row (R.). **Evolution of the Diagnostic Methods in Kala Azar with a Special Reference to a Technique for Intensive Culture from the Patient's Finger Blood. Lecture delivered at the Annual Meeting of the Grant College Medical Society.**—*Trans. Grant Coll. Med. Soc.* 8 pp. With 6 plates.

After an historical account of the diagnostic methods in kala azar the author describes, as follows, the technique for "intensive culture" by which he is able to obtain growth of flagellates from the peripheral blood in about six days:—

> "The main principle of obtaining a culture in so short a time as six days depends on the fact that k.a. blood serum contains some inhibitory bodies such as either destroy the scanty parasites or parasites of poor vitality already in the grip of the leucocytes so that even at best it takes a long time for those surviving these destructive influences, to flagellate; and I found that those destructive influences could be reduced to a minimum, by diluting the blood as you get it from the finger tip by introducing the few drops one takes up directly into say fifteen to twenty cc. of citrated saline solution before the blood has had time to clot. This diluted blood can be at once centrifugalised and the deposit of corpuscles planted directly into suitable culture media, e.g., the classical NNN medium or a simplified haemoglobin saline going by my name. Here I may state that I have been able to ascertain that the blood taken in this way from an up-country case 72 hours previously, is good enough for culture so that provided the blood is taken aseptically, it can with safety be transmitted to a central laboratory for culture in 3 or 4 days."

E. J. W.

PATANÈ (Carmelo). **Sul primo caso autoctono di Leismaniosi interna in Cirenaica.** [The First Indigenous Case of Internal Leishmaniasis reported from Libya.]—*Pathologica.* 1917. July 1. Vol. 9. No. 207. pp. 181–183.

According to the author, nearly all the cases of internal leishmaniasis hitherto reported from North Africa, between the limits of Morocco and Egypt, have been in European immigrants, chiefly Italian; out of 55 recorded cases only four occurred in natives. For two years, during which the author was quartered in Libya, he examined native patients systematically for signs of leishmaniasis without finding more than one case, the rarity of malaria in this region rendering the diagnosis relatively easy. In one native child, aged only 18 months, who presented signs of hereditary syphilis, along with an enlarged liver and spleen, smears of spleen-juice showed a few Leishman-bodies. The diagnosis was confirmed by cultivation on NNN medium, a growth being obtained in six days of the flagellated form of the parasite. The patient was not seen on any subsequent occasion, so that the case could not be followed up. The author, however, also observed in the same locality two other cases of splenomegaly in infants, of the type reported by other Italian observers in which careful observation does not detect either Leishman-bodies or any other blood-parasite.

J. B. Nias.

GONZÁLEZ BARRIO (Nieves). **Estudios sobre la anatomia patológica del kala-azar infantil (Leishmaniosis infantum).** [Studies in the Pathological Anatomy of Infantile Kala Azar.]—*Bol. Inst. Nac. Higiene de Alfonso XIII.* 1917. June 30. Vol. 13. No. 50. pp. 117–136. With 3 plates.

A study of the histology of infantile kala azar, mainly devoted to technical minutiae. The three photographic plates which illustrate the paper are unfortunately not very successful in rendering detail. Specialists will do well to consult the original paper.

J. B. N.

ROGERS (Leonard). **Further Experience in the Tartar Emetic Treatment of Kala-Azar including its Use in Young Children.**—*Indian Med. Gaz.* 1917. July & Aug. Vol. 52. Nos. 7 & 8. pp. 241–244; 265–269.

This paper embodies the details of seventeen further consecutive cases (including a series of six recoveries in children from an advanced condition of the disease), successfully treated in the European General Hospital, Calcutta, and of thirteen consecutive cases in natives. For the author's previous papers on eighteen cases see this *Bulletin*, Vol. 8, p. 3 and Vol. 9, p. 231. No instance of relapse has been noted among the total of 35 European cases, the majority of which have been either seen or heard of from several months up to over a year after discharge from hospital.

The salient features of the new cases, in which all the blood counts were made by the author, are shown in the following tables:

ROGERS (Leonard). *Indian Med. Gaz.*] [*Trop. Dis. Bull.* Vol. 11. No. 2.

TABLE I.

Kala Azar treated in the European General Hospital, Calcutta.

Number of case.	Age in years.	Duration before admission in months.	Days in hospital.	Duration of fever under tartar emetic.	Centigrammes tartar emetic to end of fever.	Total tartar emetic in centigrammes.	Maximum dose of 2 per cent. solution.	DATA BEFORE AND AFTER TREATMENT.						Results.
								Enlargement of spleen below ribs.	Weight before treatment: gain or loss.	Red corpuscles.	White corpuscles.	Ratio white to red.	Parasites.	
							c.c.	in.	lbs.					
19	6½	7	245	85	100	142	3½	5½ –3d*	31 +14¾	2,780,000 5,010,000	1,500 6,000	1-1820 1- 436		Cured.
20	9	8	300	68	79	109	4	6 ?	50½ +20½	2,960,000 4,200,000	1,625 5,750	1-1969 1- 730		Do.
21	6	8	260	98	40½	100½	5	8 ?	43 +1½	3,890,000 3,284,000	2,625 5,750	1-1482 1- 570		Do.
22	6	12	142	80	123	189	4	3 ?	28 ..	2,460,000 4.300,000	1,000 4,000	1-2460 1-1075		Do.
23	8	6	130	66	95	153	4	5½ –1d	36¼ +3¼	2,930,000 4,440,000	1,750 4,000	1-3907 1-1110		In hospital much improved.
24	8	6	111	60	96	172	4	8 –7d	48 +5	3,740,000 4,800,000	1,625 5,750	1-2301 1- 878	+	Cured.

25	11	5½	1[illegible]1	4[illegible]	11	418	7[illegible]	4 4[illegible]	[illegible] +9	4 210 000 [illegible]020 000	[illegible] [illegible]	1 [illegible]08 1 [illegible]87	−	Do
26	12	5	116	24	[illegible]	118	4	[illegible] 6½	50¼ +5¼	3 310 000 5 440 000	[illegible]000 1[illegible] 000	1 1[illegible] 1 [illegible]	−	D[illegible]
27	20	3	202	31	46	240	10	2½	[illegible]¼ +29¼	4 390 000 [illegible]40 000	4 [illegible]0 9 [illegible]00	1 1033 1 393	−	Do
28	13	½	150	51	154	298	10	4½ 2d	51 +3	4 110 000 4 [illegible]10 000	2 500 4 [illegible]50	1 164[illegible] 1 1034	+	Do
29	9	1	1[illegible]1	4[illegible]	4[illegible]	71	5	3 2d	35½ +21¼	4 [illegible]90 000 410 000	2 [illegible]00 3 000	1 204[illegible] 1 180	+	D
30	30	4	[illegible]4			41	5	3½ ±0	83 +4				−	Improved
31	10	2	96	30	20	104	10	3 3d	38 +5½	4 970 000	4 000	1 1242	+	Cured
32	24	4	70	4	12	262	10	3 2½d	102½ +18½	4 [illegible]10 000	1 37[illegible]	1 2[illegible]97	+	Do
33	15	1	90	17	42	288	8	6 6d	54 +21	2 010 000 4 [illegible]80 000	1 12[illegible] 9 2[illegible]0	1 178[illegible] 1 474	+	In hospital apparently cured
34	14	(days) 9	85	1[illegible]	80	[illegible]00	8	2 1d	79½ +7	4 360 000 4 920 000	[illegible]250 [illegible] 250	1 8[illegible]0 1 [illegible]8[illegible]	+	Do
35	22	2	58	18	82	138	7	1 −1d	77½ +11	3 220 000	2 500	1 1258	+	Cured

*Decreased in size

TABLE II.

Kala Azar in Indian patients in the Medical College Hospital.

Number of case.	Age in years.	Duration before admission in months.	Days in hospital.	Duration of fever under tartar emetic.	Centigrammes tartar emetic to end of fever.	Total tartar emetic in centigrammes.	Maximum dose of 2 per cent. solution.	DATA BEFORE AND AFTER TREATMENT.						Results.
								Enlargement of spleen below ribs.	Weight before treatment: gain or loss.	Red corpuscles.	White corpuscles.	Ratio white to red.	Parasites.	
							c.c.	Ins.	lbs.					
1	35	7	70	25	69	119	6	5 −2*	89½ +5	3,580,000 ..	2,500 ..	1-1432 ..	+ −	Cured.
2	12	7	90	22	81	109	3¾	4 −1d	38½ +16	2,120,000 4,770,000	5,250 7,500	1- 404 1- 636	+ −	Do.
3	16	12	79	25	102	135	5½	5 −3½d	63½ +9¼	1,950,000 2,820,000	1.125 4,750	1-1233 1- 589	+ −	Do.
4	30	18	56	20	115	234	7	5½ −4d	99 +5·9	3,450,000 4,770,000	3,125 8,750	1-1104 1- 545	+ −	Do.
5	23	12	70	42	96	124	4	5 -3d	70·4 +3 4	3,880,000 4,120,000	2,625 4,750	1-1468 1- 867	+ −	Do.

6	26	9	53	28	128	196	7	3½ -1½d	90 +13 8	2,160,000 3,200,000	1 500 2,750	1 180 1 1164	+ -	Do
7	28	5	37	20	72	96	6½	2½ -2d	91 0 +3 8	3,430,000 4,230,000	1,125 3,750	1 3019 1 1128	+ -	Do.
8	26	6	44	28	163	227	7	4 -2d	93 4 +5·12	2,620,000 ..	2,125 ..	1 1233 ..	+ -	Do.
9	20	12	47	26	48	75	6½	4¾ -2½d	74·0 +2·14	3,490,000 ..	3,375 ..	1 1036 ..	+ ..	Much improved.
10	8	6	52	38	12	25	2½	11 –	41½ +2½	5,820,000 ..	8,750 ..	1- 665 ..	..	Improved.
11	22	12	26	24	80	80	6½	6 2d	120 0 +3 4	4,060,000 ..	5,250 ..	1- 773 ..	+ ..	Do.
12	18	4	21	..	..	39	5½	5½ – ½d	87·8 -3·8	3,360,000 ..	1,875 ..	1 1792 ..	+ ..	No change.
13	25	12	10	..	..	45	6	7 ±0	97·12 +2·4	2,120,000 ..	1,250 ..	1 1696 ..	+ ..	Do

*Decreased in size.

In five of the cases (children) spleen puncture was not performed. They were, however, considered to be clinically typical. The results of inunctions of metallic antimony and of subcutaneous injections of antimony oxide in young children were not encouraging. In very young children the use of a general anaesthetic for intravenous injection is advised.

As compared with the earlier series of cases, reduction in the duration of treatment before fever ceased in patients upwards of ten years of age, as seen in the last eleven cases in Table I and in the first eight cases in Table II (those natives who remained a sufficient time under treatment), was effected by the quicker raising of the dose of the 2 per cent. solution to the effective point of 5 cc. and over.

"In debilitated subjects, who form the great majority of kala azar patients, the doses of tartar emetic should not be repeated oftener than every third day, as, during the first few weeks, the injections may be followed by considerable temperature reaction. In more favourable cases, the first few comparatively small doses may sometimes be given every other day if reaction is not severe, until 5 cc. doses are reached in adults, when every third day will be better."

It is mentioned that two fatalities have followed the intravenous injection of tartar emetic. In one, the patient had received several doses, gradually increasing up to 6½ cc. He then received 7 cc. but collapsed and died three hours later. At the autopsy, pleural effusion, hydro-pericardium, and ascites were found. The author does not advise increase of dose above 5 cc. of the 2 per cent. solution in debilitated Indian patients. In the second fatal case treated by an inexperienced practitioner the dose was increased from 4 cc. to 7 cc. of the 2 per cent. solution in a very debilitated patient. No serious complication was found post-mortem.

About one thousand intravenous injections of the drug have been given in the European General Hospital, with only one case of temporary collapse. A warning is given against the injection of insoluble preparations of antimony, the author having been informed of a death due to pulmonary embolism following such an injection. From a survey of nearly one thousand injections in kala azar cases the author has formulated the following rules as to dosage:

"The *maximum* dose which is required to destroy the parasites when given every third day, or twice a week, over some two or three months, is approximately 1 cc. of the 2 per cent. solution (equal to 2 centigrammes of tartar emetic) for every 10 lbs. of body weight, with a maximum of 10 cc. in adult Europeans in a good general condition and of 7 cc. in Indian patients in a similar favourable stage. This maximum dose should only be reached very gradually, and to commence with, not more than one half of it, or 1 centigramme per 10 lbs. weight, should be given to persons of 12 years and upwards, and then only if they are not very debilitated. In children of a younger age, as well as in older patients in a weak condition, the dose should not at first exceed one-third of a cc. per 10 lbs. body weight. Under this rule the dose for adults who are not very debilitated may be 4 cc. to begin with, and be increased by half a cc. at a time up to the above limits, provided severe nausea, sickness, or faintness are not produced. In a debilitated young child, say, of six years weighing only about 30 lbs. such as cases 19 and 20 in Table I, only 1 cc. should be given for the first dose, and increased by not more than ⅓ to ½ cc. at a time up to 3 cc."

One case is cited in which, through too early cessation of treatment, the patient relapsed, but further injections failed to relieve the symptoms. It is suggested that this may be an instance of the development of antimony-fast parasites.

Estimation of the coagulability of the blood before undertaking spleen puncture may prove to be a desirable precaution. The author has not yet obtained sufficient data for final conclusions but in two cases out of about twenty in which the clotting time was dangerously low and was not raised by administration of calcium chloride, this was effected by injection of horse serum and puncture was performed without ill effect.

E. J. W.

Muir (E.). **Some Further Hints on the Treatment of Kala-Azar with Antimony Tartrate.**—*Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 317–319.

For the author's previous communications on this subject, see this *Bulletin*, Vol. 8, p. 3 and Vol. 9, p. 234.

The remarks in the article now under consideration are based on a further experience of 143 in-patient cases in all stages of the disease. Their ages were as follows: 25 below six; 56 six to twelve; 26 thirteen to sixteen; 21 seventeen to twenty-five; 15 above twenty-five. Ninety-seven were discharged cured after fever had been absent for at least two months. In seventy-two of the cases in which the diagnosis was not considered quite certain, this was confirmed by spleen puncture. Of the forty-six patients not discharged as cured, thirty-three discharged themselves, and thirteen died. The latter were all in the last stages of the disease.

The commonest complications in advanced conditions are: broncho-pneumonia, diarrhoea or dysentery, low blood-pressure, and sloughing of the connective tissues, and it is pointed out that antimony-tartrate may, when given injudiciously, itself cause or aggravate them. It is recommended, therefore, that at the beginning of treatment of advanced cases the patient be kept lying down, guarded against chills and rigidly restricted in diet, the last being particularly necessary on recovery of appetite after the first few injections.

Emetine is useless in kala azar dysentery. Digitalis should be given freely for rapid pulse with low blood pressure to counteract the danger of syncope. Increase of the dose of tartar emetic should be governed by the tolerance of the patient as evidenced by the amount of febrile re-action, coughing, and nausea produced (these should never be allowed to become more than slight) together with careful consideration of the state of the pulse, bowels and lungs. The above cautions are more particularly applicable to cases coming under treatment after the first four or five months of the disease.

In advanced cases with oedema, intestinal symptoms, and low blood-pressure with rapid pulse, treatment should begin with very small doses and be very cautiously increased. In his extensive experience the author has had only one death following spleen puncture. This fatality was, in his opinion, due to disregard of the following rules which, when adhered to reduce the danger to a minimum:

> "(1) If the patient is too young to lie quietly chloroform should always be given. (2) The patient should lie flat on his back with his arms above his head and be told to breathe quietly. (3) The point selected should be immediately below the costal margin and half way between the anterior and the posterior margins of the spleen. There is slight upward and downward movement at this level but not the antero-posterior

got lower down, with the result that adhesions form more easily between the splenic and peripheral peritoneum and stop any possible haemorrhage. (4) I find it a good plan to apply a little pure carbolic to the point of selection making a white patch of the size of a two-anna piece. This sterilises the skin and makes it anaesthetic. (5) A fairly fine needle about an inch in length should be used, but not too fine to draw up blood easily, and an all-glass 20-minim syringe with good suction. (6) The needle should be introduced at right angles to the spleen but sloping slightly upwards along the long axis of the spleen. Only the outer layers of the abdominal wall should be punctured at first and one should then wait till the patient, who may have caught his breath, is again breathing quietly. The needle should then be introduced suddenly well into the spleen so as not to scratch its surface, which is the commonest cause of haemorrhage. If the patient is fatter than is usual in kala-azar patients a longer needle should be used. (7) Suction is applied for a few seconds and the piston allowed to recoil slowly. The needle is then withdrawn suddenly, and it will generally be found that a small drop of blood can be squirted out of the needle into the slide. Should there be no blood the process must be repeated making longer suction. Should a large quantity of blood be at once withdrawn a venous sinus has been pierced and it may be very difficult to find any parasites. (8) The patient should continue to lie on his back for at least half an hour and firm pressure should be applied manually below the left costal margin so as to cause demobilisation."

E. J. W.

BRAHMACHARI (U. N.). **Fourth Report on the Treatment of Kala-Azar and Some Blood Reactions in this Disease.**—*Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 319–322.

A few cases were treated with the following antimonial preparations, some being given intramuscularly and others intravenously: tartar emetic and antimony sod. tart.; lithium emetic; aniline emetic; antimonious oxide in a fine state of subdivision; luargol (a compound of antimony, silver, and arsenic); colloidal oxide of antimony; bismuth tart. solubilis. For details of these the original paper and the author's book on the treatment of kala azar [reviewed in the last issue of the *Bulletin*] must be consulted.

Certain blood reactions in kala azar are dealt with in a "preliminary report:"

1. The relative haemoglobin value of the resistent erythrocytes during haemolysis.—It is found that this factor is markedly diminished.
2. The complement deviation reaction.—Fleming's modification of the Wassermann test was used in a series of eight cases with six positive results. Using the original Wassermann method, one case out of four proved to be positive.
3. Haemalkalinity.—The average basic reactivity was found to be ·092 normal as compared with ·178 normal in a series of healthy students.
4. Haemsalinity.—The average was found to be ·6538 per cent. as compared with ·6654 per cent. in a series of healthy students.
5. A precipitate of the nature of a globulin is often obtained when the whole blood of a kala azar patient is mixed with excess of distilled water and also when the serum alone is so treated. A similar precipitate has been found to be obtainable in other diseases. A solution of the precipitate in normal saline inhibits the action of complement in a haemolytic system.

The author draws attention at the beginning of his paper to the fact that a large percentage of cases of splenic enlargement of unknown nature are admitted to the medical wards in Calcutta, in which the parasites neither of malaria nor of kala azar are to be found by splenic puncture.

E. J. W.

LONGO (A.). **Sopra alcuni casi di Kala-azar infantile trattati col tartaro stibiato.** [Some Cases of Infantile Leishmaniasis treated with Tartar Emetic.]—*Pediatria.* 1917. Aug. Vol. 25. No. 8. pp. 449–468.

Notes of some 43 cases of infantile leishmaniasis treated in an out-patient department with injections of tartar emetic after VIANNA'S method. The author admits that the results were not very satisfactory, owing to the irregularity of attendance of the patients and, in some cases, to the unwillingness of the parents to allow the treatment to be continued. The results are tabulated. In four cases death seemed to be directly due to the tartar emetic, the final dose in each case being between 4 and 5 centigrammes of the drug. The author recommends that for out-patient practice, where the children are taken home by their parents, the dose should be limited to something between 1 and 4 centigrammes, given at intervals of not less than 3 to 4 days.

J. B. N.

NICOLLE (Charles). **Chronique du kala azar en Tunisie.**—*Arch. Inst. Pasteur de Tunis.* 1917. Oct. Vol. 10. No. 1–2. pp. 90–93. *Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 715–719. With 1 map.

Fifty cases of infantile kala azar have been diagnosed by microscopic examination in Tunis during the decade 1907–17. Their geographical distribution is shown on a map.

Eighty-six per cent. of the cases occurred in children of Italian or Maltese parentage. The disease is uncommon in natives. The predominance in children of European parentage is explained by the fact that the disease is in some instances imported from Sicily, Malta and Southern Italy, and that the children are allowed to come into close association with dogs.

E. J. W.

i. CHRISTOPHERSON (J. B.), **Notes on a Case of Espundia (Naso-Oral Leishmaniasis) and Three Cases of Kala-Azar in the Sudan treated by the Intravenous Injection of Antimonium tartaratum.**—*Jl. Trop. Med. & Hyg.* 1917. Oct. 15. Vol. 20. No. 20. pp. 229–236. With 1 plate & 1 chart.

ii. SUSU (B. J.). **Espundia in the Anglo-Egyptian Sudan.**—*Ibid.* July 2. No. 13. p. 146. With 1 plate.

i. A case of espundia, occurring at Sennar on the Blue Nile, successfully treated by intravenous injections of tartar emetic, is fully described, with illustrations. The disease had been in progress for at least four years. Leishmania were found in the lesions. There was no enlargement of the lymphatic glands. Injections of arseno-benzol had proved unavailing.

Of the three cases of kala azar described, two died and one was cured. Of the two fatal cases, one was very advanced when it came under treatment. The patient died suddenly after the thirteenth injection, while sitting up in bed, using the bed-pan. Treatment had been commenced with 3 cc. of a 1 per cent. solution, followed two days later with 4 cc. and a daily increase of 1 cc. up to 11 cc. He was a male native, aged 20. The other case which died was that of a woman in whom the disease was accompanied by the—in kala azar—very fatal complication of pneumonia. The complication is considered to have been a kala azar pneumonia. Leishmania could not, however, be demonstrated in the lung post-mortem. They had been found, during life, in the spleen. It is noted that the parasites cannot be demonstrated post mortem unless the examination is made immediately after death.

The two fatal cases are published in order to draw the attention of those unaccustomed to the administration of tartar emetic intravenously to the class of case which is unsuitable for treatment.

The author recommends the use of a solution of tartar emetic containing 1 gr. to 40 minims sterile normal saline, treatment commencing with 20 minims. This, while being approximately equal in antimony content to 3 cc. of the 1 per cent. solution often used, is, on account of its small bulk, more convenient to administer.

ii. The description, with illustrations, of a case of naso-oral leishmaniasis. The patient apparently contracted the disease in the Sudan, where one previous case has been recorded by CHRISTOPHERSON [this *Bulletin*, Vol. 5, p. 274].

It is of interest to note that both patients lived for some years in or near the same town (Sennar) [see also CHRISTOPHERSON].

E. J. W.

SCOTT (L. Bodley). **Frontier Sores and their Treatment by Antimony Injections.**—*Indian Med. Gaz.* 1917. July. Vol. 52. No. 7. pp. 231–239.

Sores due to Leishmania occur on the North-West Frontier of India in all the chief military stations. From his experience of about 250 cases in the cantonment of Dera Ismail Khan the author concludes that transmission is not effected by bugs, these insects being comparatively uncommon in the locality. Moreover British officers and ladies are very frequently affected.

Sixty-three cases were treated successfully by intravenous injections of tartar emetic. The results are however discounted by the fact that time did not permit microscopic examination in more than 27 cases and that in only 4 of these were leishmania found.

E. J. W.

SINTON (John A.). **The Treatment of Cutaneous Leishmaniasis with Intravenous Injections of Tartar Emetic.**—*Indian Med. Gaz.* 1917. July. Vol. 52. No. 7. pp. 239–241.

The record of six cases of Oriental sore, in all of which leishmania was found, successfully treated by intravenous injections of tartar emetic. The results are summarised as follows :—

Case.	Total tartar emetic injected.	Duration of treatment.	Period required for cure.	Number of injections.
I	25 cgm.	10 days	12 days	5
II	89 „	29 „	51 „	9
III	12 „	8 „	13 „	3
IV	30 „	18 „	21 „	5
V	37 „	37 „	42 „	5
VI	36 „	18 „	31 „	5

A 4 per cent. solution of tartar emetic in normal saline was used, it having been stated by BORJA and AMARAL [see this *Bulletin*, Vol. 8, p. 15] that less reaction is obtained than with the 1 per cent. solution recommended by VIANNA. The dose was ½ cc. repeated every fourth or fifth day and increased by ½ cc. at each injection.

E. J. W.

LAVERAN (A.). **Boutons d'Orient expérimentaux chez les singes; multiplication des boutons primaires par auto-inoculations chez un** *Cercopithecus mona*.—*C. R. Acad. Sci.* 1917. Aug. 27. Vol. 165. p. 306.

The further history is given in detail of a monkey—*Cercopithecus mona*—whose successful inoculation with *L. tropica* has been previously recorded [this *Bulletin*, Vol. 10, p. 69]. A feature of special interest is that the first of numerous secondary lesions, in which parasites were found, developed 35 days after the appearance of the primary lesions and at the time of writing, six months after inoculation, the animal still presented unhealed sores. The secondary lesions are undoubtedly due to auto-inoculation by scratching. This observation has a practical application in the human condition. Secondary Oriental sores are frequent in man and are generally ascribed to auto-inoculation but as the lesions nearly always occur in an endemic area their cause cannot be regarded as certain.

In the monkey under observation, the primary ulcerations, contrary to what usually obtains, did not become covered with crusts and, in their secretion numerous leishmania were found.

E. J. W.

LAVERAN (A.). **Boutons d'Orient chez un Mandrill.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 455–456.

The record of the successful inoculation of a mandrill (*Mormon maimon*), with *L. tropica* from a mouse.

The technique employed was that described in this *Bulletin*, Vol. 8, p. 10.

E. J. W.

WALKER (Ernest Linwood). **Observations on Leishmaniasis and Pseudo-Leishmaniasis of the Amazon Basin.**—*New Orleans Med. & Surg. Jl.* 1917. Sept. Vol. 70. No. 3. pp. 283–292. With 2 figs.

The author's observations have led him to the following conclusions:—

"1. Tegumentary leishmaniasis is wide-spread in the Amazon basin, but is probably less prevalent than clinical observation would indicate.

"2. Cutaneous-mucosal lesions clinically similar to tegumentary leishmaniasis, but in which the specific parasites, *Leishmania*, cannot be found, are very common and are frequently mistaken for that disease. Many of these pseudo-leishmanial lesions are of syphilitic origin.

"3. The mucosal lesions of South American leishmaniasis, which have been generally considered to be a secondary manifestation of a primary cutaneous infection, probably represent a distinct primary infection.

"4. The extensive destruction of sub-mucosal tissues including cartilage, frequently observed in old naso-pharyngeal lesions of South American leishmaniasis, are probably not due to *Leishmania* but to a secondary infection which is frequently syphilitic.

"5. Minute blood-sucking flies known locally as "*piums*," and which include chiefly the Simulidae but also Ceratopogoninae, are the insects which conform best to the epidemiological data as vectors of leishmaniasis in the Amazon basin."

E. J. W.

TORRES (Octavio). **Observação de um caso de leishmaniose destruidora.** [Note of a Case of Destructive Leishmaniasis.]—*Brazil Medico.* 1917. May 5. Vol. 31. No. 18. pp. 151–155. With 2 figs.

The account of a case of muco-cutaneous leishmaniasis resulting in the total destruction of the nose without other lesions. The disease was completely arrested by 40 injections of tartar emetic given at bi-weekly intervals over a period of about six months.

The patient was a Brazilian lady, 56 years of age, who about the year 1904 commenced to suffer from a swelling in the right malar region, which was followed by ulceration inside the right nostril. A diagnosis of lupus was made by the practitioners consulted, and a variety of treatments appropriate to the diagnosis was entered upon without any success. The diagnosis of syphilis was also considered and put on one side, in the absence of any other manifestations of that disease. In spite of the best advice, the destruction of the nose proceeded until the condition shown in the two illustrations was reached, the whole of the bones of the nose and the septum being destroyed. The author of the present paper, having cognizance of the case, finally persuaded the patient to put herself under his care. Scrapings from the ulcerated surface having shown the presence of a few Leishman bodies, a course of endovenous tartar emetic injections was entered upon, in the month of November, 1915, and continued until the beginning of the following month of May, by which time the ulceration had been totally arrested, and cicatrization secured. The total quantity of tartar emetic used for the 40 injections amounted to 2·34 grammes, the individual doses ranging from one-half to one decigramme. In addition, the ulcerated surface was painted twice daily with a solution of 1 per 1,000 of tartar emetic in normal saline, containing a few drops of adrenalin.

J. B. N.

TORRES (Octavio). **Distribuição geographica da leishmaniose na Bahia.** [The Geographical Distribution of Leishmaniasis in the Province of Bahia (Brazil).]—*Ann. Paulist. Med. e Cirurg.* 1917. Feb. Vol. 8. Year 5. No. 2. pp. 39–43. With 1 map.

The most important part of this paper is the map on which are clearly shown the localities in which the principal incidence of cutaneous leishmaniasis in Brazil has been hitherto observed. The distribution very closely follows the railways, and suggests accordingly that the disease has been imported by immigrants at various dates, and is not indigenous to the country.*

J. B. N.

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* Such a distribution may mean nothing more than that enquiry, or medical practice, is less advanced in places more remote.—ED.

BOOK REVIEW.

SELLARDS (Andrew Watson). **The Principles of Acidosis and Clinical Methods for its Study.**—vi + 117 pp. With 1 fig. 1917. Cambridge, Mass., U.S.A.: Harvard University Press. [Price $1·00.]

In other publications, referred to in the bibliography, Dr. Sellards has dealt with certain special phases of the "Acidosis" problem. The subject is as important as its effects are grave, since the body possesses no satisfactory defence against acidosis. The alkalies required for the re-establishment of equilibrium must be taken from the blood and the loss thus suffered starts another train of trouble whereby tissue respiration is seriously interfered with. In normal metabolism acid radicals are formed but they do not appear in excretions. In health they are either excreted with the usual bases or they are neutralized in the body. Thus the balance between alkalies and acids is maintained at an almost constant figure.

After a short "Introduction" containing a sketch of our knowledge of acidosis and the history of discoveries and researches to which such knowledge is due, the author considers the factors of "equilibrium between acids and bases" in health and in those pathological states covered by the term "acidosis." The methods of diagnosing acidosis are divided into: (1) Clinical signs, mainly those of dyspnoea and a "picture" of "a typical air hunger" in advanced stages of the malady, and (2) Laboratory Methods. These include: Examination of the blood for lowering of alkalinity and lowering of carbon dioxide content, with estimation of any lowering of CO_2 tension in the alveolar air. Since the abnormal acids may be found in the urine careful search must be made for excess of acid and for abnormal acids. One of the signs of acidosis is an increased output of ammonia. The acids usually produced belong to a series beginning with β-oxybutyric acid and culminating in diacetic acid and acetone. Certain tests are given by various authors. The best known is the perchloride of iron test. If diacetic acid is present in the urine (which should be defecated before the test is applied) addition of perchloride of iron produces a claret colour. A somewhat similar colour may result from the presence of carbolic acid or salicylates. This latter class of reaction is not affected by boiling the urine, whereas the "diacetic colour" will not appear when perchloride of iron is added to urine which has been well boiled. A still more sensitive test for diacetic acid is the following: Nitro-prusside of sodium and strong ammonia are carefully poured into a test-tube so that they do not mix. Urine is then added and if the abnormal acid be present a magenta ring is formed at the line of contact of the two test fluids.

Acidosis occurs in diabetes, cholera, "Food intoxication" of children, probably in rickets, in infection with *B. perfringens* and frequently after inhalation of chloroform. If there is still much to learn concerning acidosis and allied conditions this small volume shows that as the result of much investigation valuable knowledge has been gained as to possible treatment of intoxication by abnormal acids. ROGERS and SHORTEN (*Indian Journal of Medical Research*, 1915) reported a series of cholera cases treated with intravenous injections of alkalies. The death-rate among 225 cases of uraemia was 2·7 per cent., "as compared with 11 per cent. in 1914, 8·5 per cent. in 1913 and 14 per cent. in 1912," when only saline infusions were used. Dr. Sellards has given much time and attention to the treatment of the uraemia of cholera. He writes: "The effect of massive doses of bicarbonate was tested by myself in a small epidemic of cholera occurring in Manila . . . satisfactory evidence was obtained that fatal uraemia could be prevented provided injections of alkali were commenced either during the stage of collapse, or even after an outspoken nephritis had developed, but before a typical uraemia had appeared. In a subsequent epidemic comprising a study of only 44 cases, a similar result was obtained." The results of such treatment are shown in the following "table":—

Treatment.	No. of Cases	Deaths in Uraemia	Total No. of Deaths.	Total No. of Recoveries.
Neutral Solution [$NaCl$].	78	12	49	29
Bicarbonate (or Acetate).	77	1	32	45

The bicarbonate of sodium is given with the saline solution and continued until the urine is alkaline to litmus. "It is not permissible to use massive injections of alkali intravenously after the urine has become alkaline." "In early cases it is entirely justifiable to administer 5 grammes of sodium bicarbonate by the mouth repeating this dose every two or three hours till the urine becomes alkaline."

The question of treatment is very fully discussed by the author and the chapter on "Therapy" is one of the best. It is given prominence here because for the general practitioner the treatment of acidosis is of most importance.

A useful "Appendix" contains "technique of methods" recently developed and of clinical importance in connection with the chapter on "Diagnosis" This is followed by a very complete bibliography. The book is well written and singularly free from misprints; its value would, in future editions, be increased by the addition of an "Index."

J. H. Tull Walsh.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 11.] 1918. [No. 3.

SLEEPING SICKNESS.

GREGGIO (G.). **Quelques observations sur la durée moyenne de vie des trypanosés en traitement.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 719–723.

The object of the work referred to in this paper was to ascertain the average length of life of patients infected with trypanosomes who submitted to treatment. The observations were made on natives in the hospital at Kisantu (Belgian Congo) and were undertaken during the period 1907–1915. Diagnosis was made by gland puncture except in those cases in which somnolence was present. The treatment administered is recorded in a previous paper [see this *Bulletin*, Vol. 7, p. 103]. The total number of patients treated was 425 ; of 205 males 84 (40·9 per cent.) and of 220 females 75 (34 per cent.) were alive at the end of 1915.

Details are given in the following table :—

			Etat des malades fin 1915.	
			En vie.	Décédés.
Malades soignés en	1907	51	20 soit 39·0 %	31 soit 60·7 %
„	1908	36	16 „ 44·4 %	20 „ 55·5 %
„	1909	29	10 „ 34·4 %	19 „ 65·5 %
„	1910	39	12 „ 30·7 %	27 „ 69·0 %
„	1911	90	38 „ 42·2 %	52 „ 57·7 %
„ „	1912	51	17 „ 33·3 %	34 „ 66·6 %
„ „	1913	79	29 „ 36·7 %	50 „ 63·2 %
„ „	1914	50	16 „ 32·0 %	34 „ 68·0 %

During the earlier years, 1907–1911, the cases were drawn for the most part from the personnel of the mission and hence were recognised in the early stages of the disease ; later the examinations were extended to neighbouring regions and consequently the cases were not so quickly recognised nor were they so amenable to treatment. Many of the latter left hospital after the first few injections and returned to their ordinary life. For this reason the author was able to ascertain the

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exact date of death in only 183 cases. The length of life in these cases is given in the following table :—

2	malades ont survécu	7 ans ½
3	„ „ „	5 „ ½
3	„ „ „	4 „ ½
1	malade a survécu	4 „
8	malades ont survécu	3 „ ½
5	„ „ „	3 „
4	„ „ „	2 „ ½
12	„ „ „	2 „
21	„ „ „	1 „ ½
13	„ „ „	1 „
39	„ „ „	6 à 11 mois
40	„ „ „	3 „ 6 „
22	„ „ „	1 „ 2 „
10	„ „ „	quelques jours

These figures show that treatment of infected cases in hospital has little advantage over the ambulatory treatment; probably the results are equal. The season of the year had no relation to the number of deaths. The author was unable to establish any relationship between the quantity of arsenic administered to the patients, and their condition in 1915. Some patients who received 80 to 150 injections were dead in 1915, whilst others who had many fewer injections, sometimes only one or two, did well. There is however no doubt that treatment prolongs life; thus of 59 patients found (on a tour) to be infected in 1911, 26 were treated and 16 (61·5 per cent.) of them were alive in February 1916, whilst of the 33 who were not treated only 9 (27·2 per cent.) were alive on the latter date.

In conclusion the author states that the average duration of life of natives infected with trypanosomes is short and that, if treatment prolongs life, neither the number of injections nor augmentation of weight which often occurs, furnishes a certain indication of the ultimate fate of the patient.

W. Yorke.

Macfie (J. W. Scott). **A Monomorphic Trypanosome of Man.**—*Report of the Accra Laboratory for the Year 1916.* 1917. London: J. & A. Churchill. pp. 60–66. With 1 chart.

The substance of this important article has already appeared and has been summarised [see this *Bulletin,* Vol. 9, p. 329]. In the present report the author compares the biometric curve obtained by measuring the trypanosomes found by him in the film of human blood with those of *T. vivax* made by various authors in different parts of Africa. The paper is illustrated by a coloured plate.

W. Y.

Teichmann (Ernst). **Die Empfindlichkeit von Naganastämmen gegen Arsen und Antimon.** [The Sensitiveness of Nagana Strains to Arsenic and Antimony.]—*Biochem. Ztschr.* 1917. Vol. 81. No. 5–6. pp. 284–318.

It has often been stated that all trypanosome strains are not equally sensitive to the same drugs. In order to decide definitely whether among trypanosomes of the same species differences in sensitiveness to drugs exist, an examination is required which should be carried out under similar conditions with the greatest possible amount of material for purposes of comparison.

The author was able to undertake such an investigation with the nagana strains at his disposal. The strains in question, which are seven in number, are those used by Braun and Teichmann in previous work and designated by them, St. 4 (obtained from Hamburg where it had been preserved in rats and mice since 1911) and St. 30, St. 63, St. 68, St. 89, St. 90 and St. 90 Fl. (all of which were brought to Europe by Braun and Teichmann in 1913 from German East Africa) [see this *Bulletin*, Vol. 3, p. 421].

The author summarises the results of his work as follows :—

1. The East African nagana strains can be clearly distinguished as regards their sensitiveness to arsacetin; these differences are equally prominent whether the drug be used prophylactically or therapeutically.
2. The strain which has been preserved longest in European laboratories (St. 4) is almost insensitive to arsenic.
3. This is equally true for infections resulting from inoculation of single individuals as for such derivatives of these strains as have become fast against their antibodies.
4. Similarly the East African strains and the West African strain (St. 4) showed differences in their sensitiveness to potassium antimony tartrate.
5. The prophylactic use of potassium antimony tartrate so far as length of action is concerned, yields results just as satisfactory for these experiments as the therapeutic use.
6. Arsacetin is a more efficacious remedy than potassium antimony tartrate in the case of infections with the East African strains.
7. Not every strain exhibits the same degree of sensitiveness to prophylactic and to therapeutic treatment with arsenic or with antimony.
8. The virulence of the strains bears no relation to their sensitiveness.
9. Each of the strains in question exhibits a specific difference in its behaviour towards arsenic and antimony. Its sensitiveness is not directed towards chemical influence in general; it must be specially determined for each single remedy.

W. Y.

Laveran (A.). **Identification des virus de trypanosomiase équine marocaine de deux origines.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 850–856.

Laveran has examined the biological relationship of *T. marocanum*, a parasite causing disease in horses in different parts of Morocco especially at Casablanca [*see* this *Bulletin*, Vol. 5, p. 414] and of a trypanosome found by Fiori and Delanoë in horses in Mazagan [*see* this *Bulletin*, Vol. 6, p. 377].

A goat immune to surra was found susceptible to the virus of Mazagan. A goat immune to the virus of Mazagan proved to be susceptible to debab, and furthermore a goat immune to the latter virus was found to be susceptible to that of Mazagan. Goats which had acquired immunity to surra and nagana as well as to *T. rhodesiense* were susceptible to the virus of Casablanca. Finally a goat immunised against surra and the infections caused by *T. soudanense* and its variety *T. berberum* was sensitive to the virus of Mazagan. After immunisation to the last, the animal was inoculated with the virus of Casablanca but proved refractory.

The following are the conclusions :—The virus of Mazagan can be identified neither with *T. evansi* nor with *T. soudanense* nor *T. berberum.* The virus of Casablanca is not identical with *T. evansi, T. brucei* or *T. berberum.* The virus of Mazagan is identical with the virus of Casablanca (*T. marocanum*).

W. Y.

KUCZYNSKI (Max H.). **Ueber die Teilung der Trypanosomenzelle nebst Bemerkungen zur Organisation einiger nahestehender Flagellaten.** [The Division of Trypanosome Cells with Remarks on the Organisation of Closely Related Flagellates.]—*Arch. f. Protistenk.* 1917. Vol. 38. No. 1. pp. 94–112. With 2 plates.

The author deals in detail with the divisional processes in various trypanosomes, *T. brucei, T. lewisi, T. equiperdum* and *T. congolense* and compares them with those occurring in various free living flagellates and in *Prowazekella lacertae.* A brief resumé of previous work on the subject is given. The paper, which is well illustrated by a plate, is of a somewhat technical character and should be consulted in the original by those interested.

W. Y.

PONSELLE (A.). **Déterminisme de la culture du trypanosome de la grenouille, *Trypanosoma rotatorium* Mayer 1843.**—*C. R. Soc. Biol.* 1917. Nov. 10. Vol. 80. No. 17. pp. 824–826.

Whilst studying the bouillon-blood medium—one of the most suitable for the cultivation of *T. rotatorium*—it was found that the indispensable action of the bouillon depended not on the presence of particular nutritive substances, but on its acidity. The peptone bouillon habitually used in bacteriological laboratories is always acid to phenolphthalin, especially after sterilisation; this acidity is due in great part to the presence of monobasic phosphates. It is the passage from a neutral medium (blood) to an acid medium which promotes in *T. rotatorium* the series of divisions bordering on cultural forms. By mixing 1 volume of infected blood with 10 volumes of a sterilised bouillon (of which the chemical constituents are given) one obtains, beginning with the large striated blood forms of *T. rotatorium,* after the rounded stage and repeated divisions of aflagellar individuals, the cultural flagellate forms in less than 24 hours. In the absence of monopotassium phosphate, or if this be replaced by the dibasic phosphate, the trypanosomes preserve their normal blood form without any tendency to cultural evolution.

Peptone (1 per cent.), gelatine (·5 per cent.) or even agar (·1 per cent.) protect the cultural forms against the trypanolytic action of the blood of the frog, probably owing to their absorbent power; this trypanolytic action is not directed against the blood forms, but causes their rapid destruction so soon as they begin to pass into cultural forms.

W. Y.

CHAGAS (Carlos). i. **Processos patojenicos da tripanosomiase americana.** [The Pathological Lesions of American Trypanosomiasis].—*Mem. Inst. Oswaldo Cruz.* 1916. Vol. 8. No. 2. pp. 5–36. With 2 coloured plates.

ii. **Tripanosomiase americana. Forma aguda da molestia.** [American Trypanosomiasis. The Acute Form.]—*Ibid.* pp. 37–60. With 5 plates.

Practically the whole of the subject matter of these two important papers has appeared before in various forms. It is, however, interesting to have the disease described afresh by the greatest authority on it. In the second of the two papers, the author gives an account of the acute stage of Chagas's disease as it is seen in children; in adults this stage is evanescent, or practically absent. The child is generally brought by its parents to the physician for the first time, after a fortnight or so of high fever, for a general tumefaction of the body, due to the deposit of a mucoid substance in the connective tissue. The skin does not pit on pressure with the point of the finger. Further examination will show enlargement of the liver and spleen, and of the thyroid gland. This condition is well illustrated by a number of photographs. Specific trypanosomes will be found in the blood. If the child does not die, the tumefaction gradually subsides, and trypanosomes are then no longer to be found in the blood. The disease then proceeds to the chronic stage, recovery apparently never occurring. In a fatal case, the autopsy will show the characteristic infiltration of the skin, enlargement of the spleen, enlargement with fatty degeneration of the liver, enlargement of the mesenteric glands, and inflammation of the intestinal mucous membrane with desquamation of the epithelium. The heart will be found enlarged and its muscular tissue friable, with fatty deposits between the muscle-fibres. There may also be pericardial effusion. The lungs and pleura may show no macroscopic lesions. The thyroid will be found congested and enlarged, while in the cranial cavity there will be meningeal inflammation with adhesions, and punctiform haemorrhages into the cerebral substance. Microscopic examination will show that all these lesions are due to the penetration of trypanosomes into the tissue elements, with rapid metamorphosis into masses of elements resembling Leishman-bodies. The ovaries and uterus in girls and the testes in boys are similarly affected. This acute stage, being never attended by recovery, passes over into the chronic form, which simulates very closely the symptoms of ordinary sporadic cretinism. A discussion of the lesions in this stage is promised for a future memoir.

In the first of his two papers the author describes the histopathology of the disease. The various symptoms are shown to be due to the destruction of tissues by extensive infiltration with parasites like Leishman-bodies. Death from heart-failure is common, due to degeneration of the heart muscle from this cause. The infiltration of the cortex of the supra-renal capsules causes bronzing of the skin, and other symptoms similar to those of Addison's disease. The cells of the neuroglia of the nervous system are also attacked by the parasites, while the actual nerve-cells are respected, the result being various degrees of muscular wasting and paraplegia. The ovarian inflammation results in early menstruation and excessive fertility in the female. The accompanying plates illustrate the majority of these lesions very graphically.

J. B. Nias.

KRAUS (R.) & ROSENBUSCH (F.). **Kropf, Kretinismus und die Krankheit von Chagas. 2. Mitteilung.** [Goitre, Cretinism and the Disease of Chagas.]—*Wien. Klin. Woch.* 1917. Aug. 30. Vol. 30. No. 35. pp. 1104–1105.

From a study of the literature of the subject and as a result of their own observations, the authors reach the following conclusions :—

1. In the mountainous regions of the Argentine are found *Triatoma* which are infected with *T. cruzi.* In some parts of these districts goitre and cretinism occur which, according to the authors' observations, correspond to the classical pictures of endemic goitre and cretinism. Acute cases of Chagas' disease have up to the present not been found by the authors.

2. In the same region, in the Calchaqui Valley, one does not meet with goitre or cretinism, but great numbers of infected insects are to be found.

3. In the provinces of Buenos Aires and Cordoba also goitre and cretinism do not occur, but, nevertheless, infected *Triatoma* are found.

4. In Argentina infected *Triatoma* are not responsible for Chagas' disease—neither the acute nor the chronic form. The causes are perhaps to be sought in the modification of the trypanosomes through the climate; on this point comparisons of virulence might give information.

5. The occurrence of Chagas' disease is not impugned. The acute form is chiefly characterised by the presence of trypanosomes in the blood and through such clinical symptoms as fever, enlargement of the lymphatic glands, increase in size of the spleen, etc.

6. The chronic form can be associated in its symptomatology with goitre and cretinism. The differential diagnosis is difficult in the mountainous districts.

7. In order to make clear the disputed points, it is necessary to demonstrate: firstly, whether in the mountainous regions of Brazil endemic goitre and cretinism occur, and secondly, whether there are in the Brazilian plains infected *Triatoma* and whether Chagas' disease also occurs there.

[For an account of the previous paper see this *Bulletin,* Vol. 7, p. 115.]

W. Y.

HARTMANN (Max). **Ueber die Schizogonie von** ***Schizotrypanum cruzi.*** —*Arch. f. Protistenk.* 1917. Vol. 38. No. 1. pp. 113–116. With 1 plate & 2 text-figs.

The author recalls that in 1910 he demonstrated that *S. cruzi,* in an aflagellar state, undergoes multiple division and that as a result large agglutinations of Leishmania-like parasites are formed ; most commonly this process occurs within endothelial cells, more rarely it is intercellular.

Lately Hartmann has re-examined his preparations and has been able to confirm and extend his previous observations. He found free uninuclear rounded up stages without a flagellum. Such forms grow and the nucleus and blepharoplast multiply until finally a stage is reached containing many nuclei and blepharoplasts. Sooner or later this stage undergoes division and hence a true schizogony occurs. Schizogony occurs in guinea-pigs intracellularly in greatly hypertrophied endothelial cells and also free in the capillaries of the lungs. In addition schizogony forms were found which did not contain the blepharoplasts. These blepharoplastless forms, which are of especial interest, relate to *Schizotrypanum cruzi* and have nothing to do with *Pneumocystis*; they can in no way be distinguished from the schizonts of many endoglobular blood protozoa (Haemosporidia), e.g., *Theileria parva*, and Haemoproteus. Hartmann points out that DOFLEIN asserts, in the recent edition of his text book, that SCHAUDINN'S conception of Haemoproteus and Leucocytozoon as trypanosomes which have, owing to their intracellular mode of life, undergone involution, is completely disproved by recent work and also that Hartmann's own order of Binucleata is untenable. In proof of this DOFLEIN relies chiefly on the work of WASIELEWSKI and WÜLKER on the schizogony of *Haemoproteus tinanculi*. Hartmann reproduces WASIELEWSKI and WÜLKER'S figure and compares it with one of his own representing schizogony in *S. cruzi* and claims that they are indistinguishable.

W. Y.

SCHWETZ. **Preliminary Note on the Tsetse-Flies of the Kabalo-Albertville (Lualaba-Tanganyika) Railway.**—*Bull. Entom. Res.* 1917. Dec. Vol. 8. Pt. 2. pp. 169–175. With 1 map.

The author points out the importance of the Kabalo-Albertville railway, connecting as it does the water-way of the Lualaba river with Lake Tanganyika, and so with Daressalaam. It measures 273 kilos. He surveyed the portion near the Lake before the line was built [see this *Bulletin*, Vol. 1, p. 56]. Only 14 days could be given to the present investigation. The vegetation is described in three sections. In the one near the river the country consists of open, slightly wooded meadow-land. In the intermediate section park and forest alternate. In the third the railway follows the river Lukuga till it joins Tanganyika; the valley is park-like, the river banks shaded. Here *G. morsitans* was common in 1911; it was now very rare, which the author attributes to progressive clearing. *G. palpalis* was only once seen, and it is concluded that these two species and *G. brevipalpis* are so rare close to the railway that they need scarcely be reckoned with. In the first section the windows of the train were bombarded by *G. morsitans*; *G. pallidipes* occurs, in smaller numbers, and *brevipalpis* is rare. In the intermediate section tsetse are few, but by search *palpalis, brevipalpis* and *pallidipes* may be found. It is admitted that the study is incomplete. The author does not believe that the presence or absence of *morsitans* is correlated with the presence or absence of big game. [The author gives no indication of the season in which his survey was made. It is well known that the species of *Glossina* may be absent or scarce at one time of year and abundant at others.]

A. G. B.

SCHWETZ. **The Western and Northern Limit of** ***Glossina morsitans*** **in Northern Katanga.**—*Ibid.* pp. 165–168. With 1 map.

This subject was considered by the author in a paper summarised in this *Bulletin,* Vol. 7, p. 112. The results of the further investigation, the notes of which are here given, are confirmatory; the limit of *morsitans* in Katanga coincides more or less with that of the "park."

A. G. B

HEAT STROKE.

GAUSS (H.) & MEYER (K. A.). **Heat Stroke. A Report of One Hundred and Fifty Eight Cases from Cook County Hospital.**—*Amer. Jl. Med. Sci.* 1917. Oct. Vol. 104. No. 547. pp. 554–564. With 7 charts.

During July 1916, 158 patients—152 men and 6 women—were admitted to hospital in Chicago suffering from heat stroke and heat exhaustion. The monthly mean temperature was the highest on record, 78·4° F. Most of the patients (79·8 per cent.) were in the third, fourth and fifth decades. Labourers comprised 64·9 per cent. of the cases; the majority of the patients gave a history of alcoholism and details are given concerning the amount of beer consumed by 25 of them during the 24 hours preceding the attacks.

The following pathological changes were found at post-mortem examination: oedema of the leptomeninges, brain and lungs; cloudy swelling of the myocardium, liver and kidneys; fatty changes in the liver; petechial haemorrhages in the brain, viscera, and skin.

As regards symptomatology the period of prodromal symptoms varied from five days to a few seconds. The patients complained of headache, dizziness, malaise, anorexia, polydipsia, nausea, vomiting, diarrhoea, epigastric distress, restlessness, stupor, insomnia and dyspnoea. As a rule when the prodromal period was a day or more the temperature on admittance was not high, when only a few hours or less the temperature was high. Sometimes the attack came on instantaneously.

The temperature on admittance varied from 94° to 114° F. Following the hydrotherapeutic measures to which the hyperpyrexial patients were subjected, there was a sudden fall in the temperatures, varying from 2° to 14° F., subnormal temperatures being reached frequently. The time required for the temperature in hyperpyrexial patients to return to normal varied from 10 minutes to three days. When the return to normal took less than several hours recrudescences of 1° to 9° F. and one to five in number usually occurred. The terminal temperatures varied from 95° to 110° F.

The pulse rates on admittance were roughly proportional to the temperatures. The respiration of comatose patients was usually laboured, rapid, shallow and gasping. The skin was commonly hot, dry and cyanotic, and after a decrease in temperature cold and clammy. Nearly all the patients had involuntary bowel movements, many vomited and a few had haemorrhages per rectum and per mouth.

Details are given regarding the blood pressure, blood counts and condition of the urine. The great majority of the cases (129) were in coma on admittance, 10 were stuporous, but could be roused, 3 were in active delirium and 16 were conscious and rational. Fifty-eight died without regaining consciousness and 10 had relapses after regaining consciousness and died; the other two deaths occurred in patients who were conscious on admittance. Particulars are given relating to the reflexes and nervous symptoms.

The paper closes with the following account of the treatment adopted :—

All patients with a temperature of 103° or over were immediately placed in a tub of tap water, the level of which was just high enough to cover the body except the head, which was supported in a hammock packed with ice. Vigorous friction was applied to the entire body by four or more persons ; ice was freely added to the water, the friction being constantly maintained ; the temperature was taken rectally every minute. When the temperature reached 102° the patient was removed from the bath, wrapped in sheets or blankets, and returned to the ward. Generally 102° was reached in ten to thirty minutes. When the patients were returned to the wards their temperature usually continued to fall, frequently reaching subnormal 95° to 97°. Cardiac stimulants were given freely, strychnin, sodium caffein benzoate, digitalis, strophanthus ; an ice-bag was placed at the head and chipped ice was given by mouth. For subnormal temperature external heat was applied. For recurrences in temperatures up to 103° cold packs and alcohol sponges were given ; above 103° the patient was again given a cold water friction bath. It was observed that recurrent temperatures could not be reduced as easily as the initial high temperature, and in a few instances the temperature continued to rise in spite of prolonged friction in cold water. For restlessness and convulsions sedatives were used ; morphin, chloral hydrate, scopolomin, the bromids, and mechanical restraints.

W. Y.

AMAR (Jules). **Origine et prophylaxie du coup de chaleur.**—*C. R. Acad. Sci.* 1917. May 21. Vol. 164. No. 21. p. 834.

The causes of heat stroke are toxins produced by muscular fatigue and insufficient oxygenation of the blood. Several workmen and soldiers were made to carry a load weighing 60 kg. or set to work an ergometric cycle at 192 revolutions per minute with a friction of 3 kg. ; the shade temperature was between 35 and 39° C. It was found (1) that either in the shade or in the sun intense exertion when prolonged gave rise towards the fifth or sixth hour to functional troubles and to signs indicative of heat stroke—giddiness, somnolence, headache, pallor ; and (2) that regulated work interrupted by frequent rest, like moderate activity, never menaced the physiological state. Resistance to heat, with the same degree of fatigue, was always greater when owing to loose and light clothes respiration was not impeded. Heat stroke therefore does not occur without fatigue and it is not observed, or only rarely, when a good pulmonary ventilation is assured.

Great muscular efforts impede the respiration, and pulmonary ventilation is less by 25 to 30 per cent. than is the case in rhythmical periodic work, necessitating efforts as much increased. Again, the intense heat of the atmosphere produces a characteristic dyspnoea with short inspirations admitting into the lungs an insufficient volume of air ; and this air on account of its thermic expansion is poor in oxygen. Finally tight clothes and the bent position of the thorax diminishes by 20 per cent. on an average the volume of air breathed. Oxygen in the blood inhibits heat stroke by destroying the toxins of fatigue ; experience has shown that oxygen is in this respect a powerful antitoxin. The author has found it exceedingly useful to cause men engaged in a severe task to take very deep respirations at convenient intervals.

The following prophylactic measures are recommended for the use of soldiers especially:—

Allow the shoulders and the thorax the maximum of freedom. The clothes should be loose and light without a collar. Shift every heavy load towards the loins. Take on necessary occasions deep respirations with the head thrown back and the mouth open. Finally sniff a mixture of water and vinegar and moisten the face with it. This fluid produces a sensation of freshness which stimulates the respiratory reflexes.

W. Y.

NICHOLSON (M. A.). **The Reduction of Temperature in Railway Carriages running in Hot Weather.**—*Indian Med. Gaz.* 1916. Oct. Vol. 51. No. 10. pp. 369–371.

An experiment was undertaken in an ambulance train while travelling through the Sind Desert with a view to ascertaining the efficiency of certain methods of attempting to lower the temperature of a railway carriage running in hot weather.

Four similar ward cars were used. These were ordinary third class N.W.R. bogie coaches, fitted with upper and lower berths running lengthways down the car to accommodate 24 invalids; a bathroom and lavatory and a sinkroom were provided at alternate ends, and six electric fans working from the roof were provided in each car.

In the first of these cars, three sheets were hung close under three of the fans and were kept saturated with water all day. In the second car, two one-maund [maund = about 82 lb.] blocks of ice were kept standing all day in the centre of the car. The third car was used as a control and the fourth had its roof and sides well soused with water at every convenient halt. The temperature of each car was taken at the same time every two hours and the results which are given in a table indicate that none of the above measures were of any avail in lowering the temperature.

The author quotes the work of LEONARD HILL and of PEMBREY as showing that in order to keep cool in hot weather man relies chiefly upon the evaporation of his own sweat.

After discussing the various factors involved Nicholson concludes that the chief principles of hot weather travelling are, firstly the avoidance of coupé and corridor compartments and the use of carriages running the breadth and if possible the length of a coach, secondly the intelligent use of fans, and thirdly the running at the highest speeds possible.

W. Y.

SHAKLEE (Alfred Ogle). **Experimental Acclimatization to the Tropical Sun.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1917. Jan. Vol. 12. No. 1. pp. 1–22.

The experiments described in this paper were conducted on monkeys of the genus *Pithecus.* During the work four objects were kept in view: (1) To see if the monkey gradually exposed to the sun would undergo a change which would enable it to live in the sun throughout a hot day; (2) if this change should take place, to learn its nature;

(3) to determine the relative importance of the various meteorological factors which may combine to influence acclimatization; (4) to learn how far extraneous factors, such as work, excitement, clothing, drugs, diet, and disease, may influence the course of events.

The following are the author's conclusions:—

"1. The normal temperature of the Philippine monkey probably varies between 37·5° and 39·5° C.

"2. Unacclimatized Philippine monkeys (genus *Pithecus*) exposed to the sun in Manila live or die of heat stroke in the course of from several minutes to several hours, depending upon the conditions.

"3. The conditions making for a rapid death are: A hot sun; proximity of a large, hot surface, such as the ground or a roof; high relative humidity of the atmosphere; and a low wind velocity.

"4. The death under these conditions is due to an accumulation of heat in the body.

"5. The lack of any one of the above conditions may prevent death.

"6. The effect of the sun's rays alone on this monkey is comparatively slight.

"7. These monkeys on a suitable diet become acclimatized to the conditions mentioned, if exposure to the conditions is gradual.

"8. A small dose of atropin will cause the death of an acclimatized monkey by stopping the perspiration.

"9. The acclimatization consists in an increase in the sensitiveness of the nervous mechanism which regulates the body temperature. The increase in sensitiveness produces an increase in the rate of perspiration under the conditions named above, producing in this way what may be termed an immunity

"10. This immunity is readily lost if the monkeys are kept in the shade.

"11. Some forms of sickness diminish the powers of resistance to the above-mentioned conditions.

"12. Some toxins produced in the intestine lower this resistance.

"13. Rabbits showed no increase in resistance when treated in the manner used to acclimatize monkeys.

"14. Healthy white men may be readily acclimatized to the conditions named, that is, to the tropical climate at its worst.

"15. The amount of sweating necessary to keep the body temperature of a healthy white man from rising above normal is not excessive, even when the man is doing considerable physical work in the midday sun in such a tropical climate as that which obtains at Manila, provided the man has been sufficiently long on a suitable diet and introduces himself gradually into the work in the sun.

"16. In the acclimatization of the white man the most important factor is the proper regulation of the diet.

"17. The effects from the tropical sun seemed to be exactly the same as the effects from the sun in the United States; that is, no effects were seen or felt in these experiments that were different from what would have been expected under like circumstances in the northern portion of the United States."

W. Y.

Koizumi (S.). **[Experiments bearing upon the Pathogenesis of Thermic Fever (Sunstroke).]** *Tokyo Igakukai Zasshi.* (*Mitteil. d. Gesellsch. z. Tokio.*) 1916. Nov. 5. Vol. 30. No. 21. pp. 47–48.

[From Review by R. G. Mills].

In the cadaver of a person who had died from sunstroke there is an early onset of rigor mortis and a high post-mortem temperature; the blood is dark and clots slowly.

Rabbits were placed in specially constructed cages, in which the temperature and humidity could be accurately controlled, and were kept under varying conditions as regards temperature and humidity for different periods of time. A temperature of 30°, 35° or 38° C. for 5–8 hours daily for ten days produced no symptoms beyond a rise of temperature, dyspnoea, faintness and diarrhoea. Analysis of N, Ca, SO_2, and NH_4 showed no great variation from the normal.

Increase of the humidity up to 85–90 per cent. did not suffice to cause the typical symptom-complex of sunstroke; the only pathological changes observed were an increase in the density of the blood and a decrease in its alkalinity. Prolonged exposure of an animal to a temperature of 41° C. caused slight injury to the red blood cells.

In other experiments the animals were caused to exercise vigorously under the same conditions. After 2–5 hours they suddenly became cyanotic, suffered from dyspnoea, were convulsed and died in a few minutes. In these cases the post-mortem signs were similar to those occurring in man, viz.: delayed coagulation of the blood and decreased alkalinity or acidosis. The blood was also of a dark colour, and haemolysis had occurred.

Under normal conditions the oxygen content of the blood of the animals was 14·59 per cent. and that of CO_2 35·67 per cent., but after exposure to a temperature of 35–37° C. for three hours the figures were respectively 5·58 per cent. and 11·67 per cent. The oxygen combining power of the blood of a rabbit under the conditions of heat and humidity for three hours at 35° C. was 41·9 per cent. but after exercise only 29·3 per cent. The normal colour and combining power was restored in the drawn blood by a short exposure to the air. Injection of the blood into other rabbits before and after exposure to the air produced very different results. The author believes that these experiments prove that the blood is unable to dispose efficiently of the products of metabolism which are produced in abnormal amounts under the severe conditions of exercise in high temperature and humidity.

W. Y.

BERIBERI AND POLYNEURITIS AVIUM.

CHICK (Harriette) & HUME (E. Margaret). i. **The Distribution in Wheat, Rice, and Maize Grains of the Substance, the Deficiency of which in a Diet causes Polyneuritis in Birds and Beri-Beri in Man.** —*Proc. Roy. Soc.* 1917. Dec. 1. Ser. B. Vol. 90. No. B. 624. pp. 44–60.

ii. **The Effect of Exposure to Temperatures at or above 100° C. upon the Substance (Vitamine) whose Deficiency in a Diet causes Polyneuritis in Birds and Beri-Beri in Man.**—*Ibid.* pp. 60–68.

i. The occurrence of cases of beriberi among the military forces in the Dardanelles and Mesopotamia, whose diet consisted largely of tinned foods and white bread or biscuit made from white flour, directed attention to the examination of these foods as causative agents. The foods by the heat sterilisation they receive are well known to be deprived of their anti-beriberi constituent. The authors therefore by a number of well considered experiments determined the nutritive properties of cereals generally, and wheat in particular. The work done by FUNK, COOPER, and others is first reviewed. Two methods for experimentation are applicable, preventive and curative. The former was the most satisfactory method of determining the vitamine content of the food stuffs since it gives more regular results but long and careful research is required so that curative experiments were also carried out. It was proved that in both the rice and wheat grain the anti-neuritic vitamine is concentrated mainly in the germ or embryo, a small amount only being present in the bran, all of which is absent in white flour. Therefore the importance is evident of including the germ in the flour from which the bread or biscuit is made, especially when the diet consists largely of tinned foods. It was found that "the daily ration of wheat germ required to be added to a diet of polished rice to prevent the onset of polyneuritis is the amount which administered by the mouth will cure a pigeon acutely ill with polyneuritis brought on by an exclusive diet of polished rice." It was also determined that the addition of wheat germ to a diet of polished rice sufficient to prevent polyneuritis also maintained the weight and general health of the birds. Rations in excess of this led to an increase in body weight and in the general well-being and vitality of the birds, whereas extracts of the rice bran or yeast, though sufficient to prevent polyneuritis, did not maintain weight. A large number of tables setting out the experiments are given which should be studied with the original.

ii. A further series of experiments was made to determine the influence of exposure to high temperatures on the vitamines in the different foodstuffs, the deficiency of which causes polyneuritis in birds and beriberi in man. Though many observations on this point have been made no accurate readings have been systematically taken before of the real temperature reached and maintained in the interior of the substances heated. The authors describe in detail the method employed and from the tests curves were constructed from which accurate estimates could be made of the temperatures actually experienced by the materials exposed. From these they drew the following conclusions :—

(1). Exposure of wheat embryo to a temperature of about 100°C. for two hours resulted in no significant loss in anti-neuritic vitamine. If therefore it (the embryo) is included in the flour from which the bread or biscuit is made, it can be relied upon to retain its anti-neuritic properties after baking.

(2). At temperatures of about 120° C. however there was a swift destruction of the anti-neuritic properties.

When soluble yeast extracts containing about 35 per cent. of solids were similarly treated, slight loss of vitamine is evident after one hour's exposure to 100° C., relatively rather more than with wheat embryo ; but at 120° C. destruction of the vitamine was rapid.

P. W. Bassett-Smith.

CHICK (Harriette) & HUME (E. Margaret). **The Distribution among Foodstuffs (Especially those Suitable for the Rationing of Armies) of the Substances Required for the Prevention of (A) Beriberi and (B) Scurvy.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. July. Vol. 10. No. 8. pp. 141–186. With 6 figs. [With Discussion.] *Jl. Roy. Army Med. Corps.* 1917. Aug. Vol. 29. No. 2. pp. 121–159. With 6 figs.

In this very interesting paper the authors give a short résumé of our present knowledge of the deficiency theory of beriberi and scurvy, which they consider is fully proved. Man requires for complete nutrition not only a suitable supply of protein, fat, carbohydrates, salts and water, but also an adequate amount of accessory food factors, called vitamines. The definite composition of these latter is not yet known, but there are essentially two, an anti-beriberi and an anti-scurvy vitamine. Each plays a special role in metabolism, each possesses distinctive properties, and they are differently distributed among foodstuffs. Tables are given showing the amount of various substances required to *prevent* the development of neuritis in birds when fed on polished rice (experiments carried out by COOPER, and later, by themselves) and also the minimum amount required to cure under similar conditions. They found that in the preparation of extracts there was always a large amount of loss in the active principle; for example, 10 grammes of dried peas was curative, whereas it took the extract of 40 grammes to give the same result. These tables show that the anti-beriberi vitamine is very widely spread, being present in a greater or less degree in almost every natural foodstuff, but that the principle source is found in the seeds of plants and the eggs of animals. They go on to demonstrate that this vitamine is fairly resistant to heat, not being destroyed at a temperature of 100° C. in two hours, and that it is most abundant in the germ of the cereals. Milk, cheese and potatoes are among the least valuable anti-neuritic substances.

Anti-scurvy vitamines are much less abundantly represented in food, and are much less stable, being easily destroyed by heat and drying. HOLST, FUERST, and FROELICH carried out much experimental work with regard to scurvy and on these the further experiments by the authors were chiefly based. They used guinea-pigs but, as is shown, these animals are very susceptible to scurvy and very great care and attention had to be paid to the animals to eliminate loss of weight, etc., due to starvation and inanition, before they could obtain any useful results. The onset of the disease was gradual; generally after about 17 days there is evidence of tender joints, the weight declines, in about another 10 days the teeth become loose, and death soon follows, evidence of scurvy being present post mortem. The administration of fresh orange juice was rapidly curative except that the joints remained tender. A diagram is given showing the course of the disease in six typical experiments with and without anti-scurvy adjuncts to the food. The addition of autoclaved milk, though it did not prevent the scurvy, kept the animals in better condition.

The value of the various foodstuffs as preventive against scurvy and beriberi is given in a table which shows at a glance the most important substances that can be used, and it is noted that these results are in agreement with those of the Norwegian workers. The anti-scorbutic properties are present in all living tissues of plants, and to a lesser degree in those of animals. They are not present in dried vegetables, peas, and seeds, but as was originally shown by FUERST (1912) the anti-scorbutic principle is created anew with the beginning of active cell life, that is when the seed begins to germinate.

The efficiency of fresh fruit juices is well known, and in arctic and antarctic exploration that of fresh meat was recognised, but milk appears to be almost deficient in both anti-scurvy and anti-beriberi vitamines. Preserved lime juice gave disappointing results in the hands of the authors for the prevention and cure of guinea-pig scurvy, though HOLST and FROELICH (in 1912) found that it had distinct anti-scorbutic properties. [Further investigations are being carried out on this important subject.]

An interesting object lesson is given on the study of the conditions of our troops during the siege of Kut. In the early stage, beriberi occurred amongst the British troops, but *it then disappeared.* During the first two months they received a ration of wheat flour, but after that from one-third to one half of this flour was replaced by barley flour and coarse milled wheat flour. These men were also protected from scurvy by receiving an ample ration of horse meat. On the other hand the Indian soldiers were supplied with cereals and beans containing abundance of anti-beriberi vitamines; these had no anti-scorbutic properties and as they did not eat the meat, and fresh fruit and vegetables were not procurable, scurvy was very prevalent among them. The deduction is therefore drawn:—

> **"For the prevention of beriberi it is in the highest degree desirable that the germ (embryo) and the bran of wheat should not be excluded from the flour destined for manufacture of bread and biscuit for troops on active service. This is the more necessary when the troops are separated from fresh food supplies and the rest of the ration consists largely of tinned foods, seeing that these articles are deficient in *all* vitamines, owing to their previous sterilization at high temperatures. . . . . To prevent scurvy, if a supply of fresh fruit or vegetables is not procurable, germinating pulses should be added to the diet."**

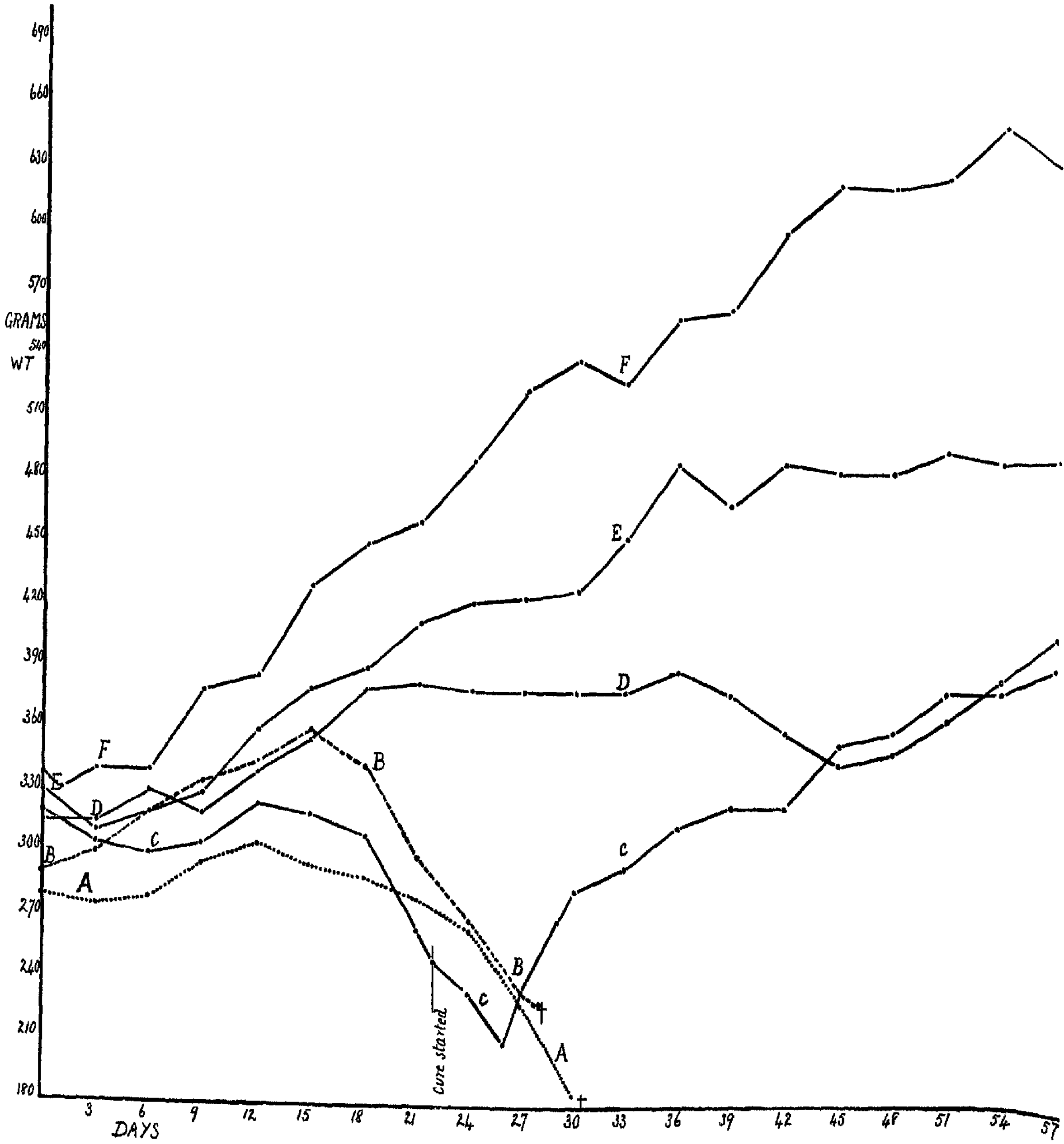

FIG. 4.

Weight Charts of five typical experiments showing the anti-scorbutic value of orange juice and fresh cabbage leaves.

CURVE A. Typical scurvy on a diet of oats, bran and water.

CURVE B. Typical scurvy on a diet of oats, bran and sterilised milk (heated to 120° C. for 1 hour in the autoclave).

CURVE C. Typical scurvy on a diet of oats, bran and water, cured by addition of orange juice and autoclaved milk to the diet on the 22nd day, when the symptoms were well marked.

CURVE D. Weight chart showing influence of 5 cc. fresh orange juice daily added to the "scurvy" diet; autoclaved milk added to the diet on the 56th day.

CURVE E. Normal weight chart on a diet of oats, bran and cabbage leaves (30 grams daily).

CURVE F. Weight chart on diet of oats, bran, autoclaved milk and 3 cc. fresh orange juice daily; specially favourable circumstances—warm weather, &c.

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TABLE IV.

Value of Foodstuffs as Preventive against Scurvy and Beriberi.

Foodstuffs.	Water content per cent. (Approx.)	Value against Beriberi.	Value against Scurvy.
CEREALS—			
Whole grain, wheat ..	10 to 13	++	0
Endosperm, polished rice		0	0
,, white flour (wheat)			
Bran, *e.g.*, rice		++	0
,, ,, wheat ..			
Germ or embryo, *e.g.*, rice		+++	0
,, ,, ,, wheat			
PULSES—			
Whole, in dry condition ..	12	++	0
GERMINATED PULSES (or Cereals)	50	++	+++
VEGETABLES—			
Potatoes	80	0	++
Fresh, *e.g.*, cabbage ..	90	+	+++
,, ,, onions ..			
,, ,, carrot ..			
Desiccated vegetables ..	10 to 15	+	+ to 0 according to age
Pickled, *e.g.*, cabbage ..	—	—	0
FRUIT JUICE—			
Fresh, *e.g.*, orange ..	90	—	+++
,, ,, lemon ..			
EGGS—			
Fresh	70	++	—
desiccated..	5	++	0
MEAT—			
Fresh	70	+	+
Tinned		0	0
MILK—			
Cow's, fresh	87	0	+ (slight)
YEAST—			
Pressed, autolysed ..	77	+++	0
Extract, commercial sample A	30	+++	0

— Signifies not investigated.

In a short appendix the method of preparing the germinating legumes for use is given. It is particularly important that the seeds should have free access of air when growing and that they should be cooked and eaten as soon as possible after germination, because if allowed to dry the anti-scurvy substances would be destroyed.

P. W. B-S.

Cobb (R.). **Beriberi in North Borneo.**—Appendix to the Territorial Medical Report for 1916, State of North Borneo. 8 pp. (MS.)

Beriberi has been recognised in North Borneo for some years but has rarely shown any serious epidemic characters. Various estates and a few Government institutions have occasionally suffered, notably in the Leper Settlement in 1913 As rice is the staple diet such outbreaks are not unexpected and the returns from the Government Hospitals show that the greatest incidence is amongst paupers, opium eaters, gamblers and among the coolies employed on the rubber and tobacco plantations.

The high incidence at different hospitals could always be traced to special camps and estates Further enquiry into these small epidemics showed that they were always associated with a deficiency in the food supplied, and in two instances to the temporary use of Saigon rice. The same difficulties were found as in most other Oriental communities in supplying and getting the natives to use unpolished rice and, as the report states, much depends on the careful supervision of the dietary of the camps by the managers, but these are backward in acting individually for fear others will not do so and thus they stand to lose their coolie labour. The following recommendations are made :—

(1). An import duty on all white unpolished rice.

(2). The provision of a sufficient ration of cooked food by the employers of labour, the word sufficient referring to both quality and quantity.

P. W. B-S.

Travis (F. M.). **Beri-Beri, or Endemic Multiple Neuritis, with Report of Twenty-One Cases.**—*Kentucky Med. Jl.* 1917. Oct. 1. Vol. 15. No. 10. pp. 476–482.

The observations were made from cases occurring among prisoners, and it is stated that their cells were all clean and in good sanitary condition. Only three cases were taken from basement cells and the outbreak therefore was not due to damp. Twenty of the patients showed serous effusions, and oedema of the legs, scrotum, penis, and back was noted in all but one of these. About 50 per cent. showed a decided atrophy of the muscles with wrist or foot drop. Deficiency of food and overcrowding did not appear to be etiological factors. The paper deals chiefly with the clinical characters of the disease and, as there were no deaths, no pathological evidences were obtainable. Believing that the disease is one in which autointoxication plays an important part, the author's treatment was carried along the line of elimination and support, strict hygienic measures being enforced.

Medicinally, acetate of potash and digitalis were given for the oedema, with purgatives and strychnine. Abundant acid drinks (lemonade) were advised, and fresh fruit added to the diet. The cases were segregated and disinfectants were freely used.

P. W. B-S.

Albert (Jose). **The Pseudomeningitic Form of Infantile Beriberi.** (Proceedings of the Manila Med. Soc.).—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1917. May. Vol. 12. No. 3. pp. 166–167.

Two clinical forms of infantile beriberi are generally described, the chronic aphonic and the acute pernicious cardiac types. The author refers to three cases in which the symptoms of meningitis were most prominent but in each X-rays demonstrated the characteristic enlargement of the heart, and the curative effects of extract of tiqui-tiqui were rapid.

P. W. B-S.

MANALANG (C.). **Degeneration of Peripheral Nerves.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1917. July. Vol. 12. No. 4. pp. 169–178. With 2 plates.

The object of this paper is to show that degeneration of nerves is very commonly found in other conditions than beriberi when examined by Marchi's method, and is therefore not a good factor alone on which to make a diagnosis. At Manila out of a total of 104 general autopsies, 88 showed microscopically degeneration of the peripheral nerves, 55 slight, 29 moderate, and 4 marked. Of these 88 more than half were between the ages of 20 and 50 years and 69 had nephritis of some form or other. The value of the deductions are much discounted as the author states that (1) in Manila beriberi is endemic; (2) there is the possibility of many unrecognised cases of mild beriberi dying of other diseases; also (3) there may be many cases who have recovered from beriberi and have died of other diseases. The subjects were all Filipinos, the working class of which are in general insufficiently fed upon an excessively non-nutritious and monotonous diet, which goes far to explain the high incidence of neuritis found in the 104 examinations.

P. W. B-S.

YOSHIKAWA (I.), YANO (K.) & NEMOTO (T.). **Studies of the Blood in Beriberi.**—*Arch. Intern. Med.* 1917. July 16. Vol. 20. No. 1. pp. 103–111.

The study of the blood in beriberi has received considerable attention from Japanese observers. The authors, using the refractometric method described by STRAUSS in 1904, applied this to beriberi cases and a number of tables of their results are given from which they draw the conclusion that the refractive index of the serum of persons suffering from beriberi often shows no deviation from the normal, but not infrequently there is a marked rise. The rise is generally considered to be due to an increase of the protein content, but it may also be caused by a retention of non-protein substances. A determination was made of the urea in the blood, using AMBARD's coefficient, for 11 cases of beriberi. That of a healthy person ranges from 0·06–0·08; in beriberi it varied between 0·07–1·36. The two patients who had the highest coefficient died. Thirty-three patients were tested by other methods and from these results a considerable retention of urea was shown to be present in the most severe cases, which might be due either to lessened elimination from weak cardiac action, or increased protein metabolism; to clear up this, further study is required. They state that even when the clinical symptoms of a case are severe, if the function of excreting urea is intact, the prognosis is hopeful and that it is possible that the cardiac failure in beriberi is due to the accumulation of some unknown products in the blood, the elimination of which is coincident with the elimination of urea.

P. W. B-S.

CHUN (J. W. H.). **The Differential Leucocytic Count in Beri-beri.**—*National Med. Jl. of China.* 1917. Sept. Vol. 3. No. 3. pp. 113–115.

The author records the results of counts of 42 cases using 300 cells as a basis of his observations, but no record is given of the clinical differences of the cases. He gives the following as the average of the 42 observations :—

Finely granular oxyphiles	57·4%
Coarsely „ „	5·2%
Basophile leucocytes	0·4%
Hyalines	19·5%
Lymphocytes	17·2%

The hyaline cells were thus above the normal, but he states that the normal among healthy Chinese is 9·8 per cent., considerably higher than that found in Europeans.

P. W. B-S.

SUZUKI (Tadashi). **Ueber den Aminosäurengehalt im Säuglingsberiberi-Harn.** [Amino-Acids in Urine of Infantile Beriberi Cases.] [Japanese text.]—*Kyoto Igaku Zassi.* 1917. May. Vol. 14. No. 4. [Author's Summary in German, p. 48.]

The author estimated the amount of amino-acids in the urine of infants suffering from beriberi by means of VAN SLYKE's method, and also made some experiments on cats and dogs. He found that in recovered infants the percentage was 2·6 and remained very constant. In cardiac cases and in the early acute condition there was a considerable increase, falling in the latter stages to its normal. He concluded that the increase of the aminoacids in infantile beriberi was probably brought about by difficult oxidation consequent on insufficient hepatic action; nevertheless the investigation showed that the intermediate nitrogen metabolism of beriberi in infants is distinctly injured even up to the sixth or seventh week of the disease.

P. W. B-S.

HULSHOFF POL (D. T.). **X-Acid as a Remedy in Polyneuritis and Beri-Beri.**—*Jl. of Physiology.* 1917. Dec. Vol 51. No. 6. pp. 432–439.

The history of Dutch investigations of the value of katjang idjoe beans (*Phaseolus radiatus*) in the treatment of birds suffering from polyneuritis and men from beriberi is recorded. The author finding that the beans were so effective attempted to isolate the active principle. The decoction was treated with lead acetate and the lead afterwards removed by H_2S, and CO_2 was passed through to remove the H_2S. The purified extract was then evaporated to dryness and crystals obtained; these were acid and this acid substance was believed to be the active principle and was called "X Acid."

GRIJNS used this in the form of pills for polyneuritic fowls without success. The author gave it in solution to birds and obtained better results, and the amounts required for cure were estimated. It was found that the relative curative value of the beans decreases by process of extraction; that is, the more the active principle is purified the more it loses its effect. Ten gms. of the beans is required to cure a fowl but of the chemically purified decoction 600 gms. Further experiments were made by concentrating the X acid solution so that 1 gm. of dried extract dissolved in a small quantity of water was efficient for cure, and this was far more easy to administer. The details of the 28 experiments are set forth.

P. W. B-S.

KON (Yutaka) & OKAZAKI (Mitsuhisa). **On the Contribution to the Disease of Pigeon due to Partial Inanition.**—*Sei-i-Kwai Med. Jl.* 1917. Sept. 10. Vol. 36. No. 9. Whole No. 427. pp. 91–100.

A number of experiments were carried out by the authors to determine :—

(1). Whether pure rice starch contains some substance which causes beriberi and whether the rice bran contains an antagonising substance.

(2). Whether when birds are fed on fermented rice they get the disease sooner than when they are fed on untreated polished rice.

(3). Whether by administration of pure vitamines with polished rice the disease can be prevented.

As the bones tend to undergo a change when the animal is fed on an exclusive diet, the bones and marrow of diseased birds should be more particularly studied.

A large number of pigeons were used for these experiments and the following conclusions were arrived at :—The usual change in pigeons fed on exclusive starch or fermented polished rice showed itself on the 16–17th day. A condition of partial inanition a few days before is an important factor in the development of nerve changes and fermentation has nothing to do with them. The neural changes due to feeding on polished rice do not depend on the quantity given, and are not due to simple inanition, but they are related to partial inanition. The effective quantity of the substances contained in the rice bran is not absolute but varies according to the quantity of polished rice given. The relationship between the decrease of bodily weight and neural changes is not absolute. The relationship between the neural changes and the hypertrophy of the heart or haemorrhage in the bone marrow is not constant.

P. W. B-S.

UNCLASSED FEVERS OF TROPICS AND DENGUE.

MARIANO (Francisco). **A dengue. Considerações a respeito de sua incursão no Rio Grande do Sul, em 1916.** [An Outbreak of Dengue in Rio Grande do Sul (Brazil) in 1916].—*Arch. Brasileiros de Med.* 1917. May. Vol. 7. No. 5. pp. 272–277.

Notes of an outbreak of dengue occurring in March, April and May, 1916, in Brazil. The symptoms were apparently classical. The number of cases is not stated. The outbreak was immediately followed by another one of influenza, which afforded a good opportunity for comparing the distinctive features of the two diseases. Dengue has been recognised in Brazil since the year 1846, and then received the local name of "polka," after the dance of that name, from the stiffness of gait which is exhibited by the patients.

J. B. Nias.

STEFKO (W.). **Dengue à Trébizonde (Turquie) en 1916.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. p. 724.

The author states that dengue is very prevalent in Turkey, especially during the months of June and July, and that in the lower quarters of the town of Trebizond it spreads most. The intermediate host is the *Stegomia fasciata.* Deaths are very rare but post-mortem evidence of meningitis and acute gastric enteritis has been found. No details are given.

P. W. B-S.

YAMAGUCHI (K.), KOIZUMI (M.) & JONOMURA (K.). **[Dengue Fever.]**—*Juzenkai Zasshi.* (*Jl. Perfection Med. Soc. Alumni of Kanazawa Med. Sch.*). 1917. May 14. Vol. 22. No. 5. p. 45. [From Review by R. G. MILLS.]

The authors state that the virus of dengue is in the blood and that so small a quantity as 0·00005 cc. is able to carry the disease, the carriers being *Stegomyia scutellaris, Desvoidea obturbans* and *Culex fatigans.* The first is the most dangerous and is infective within four days after having bitten a person suffering from the fever.

P. W. B-S.

COOMBS (C. F.). **The Recurrent Type of "Trench" Fever in Mesopotamia.**—*Lancet.* 1917. Feb. 3. p. 183.

A case of recurrent fever is described in an officer who was employed at the advance base and who had never been in the fighting line. In all, six attacks of pyrexia were experienced with a week's interval between each, the attacks being gradually reduced in intensity but producing an increasing amount of debility. Before the first attack beriberi symptoms were noticed and with the fever shin pains were marked. The syndrome of symptoms was similar to those of the recurrent type of trench fever noticed on both the Western and Eastern fronts. Blood examinations showed no evidence of spirochaetes and no indication of paratyphoid infection, but a polynuclear increase was present with the pyrexial attacks as has been recorded elsewhere.

The exact causation was therefore not determined. The usual blood sucking parasites common to most military areas were present. The case made a good recovery finally, unattended with sequelae. Two similar cases are mentioned but full notes were not obtainable.

P. W. B-S.

BLAKE (G. A.). **Probable Causes of Fever in the Waziristan Field Force.** —*Indian Med. Gaz.* 1917. Nov. Vol. 52. No. 11. pp. 393–394. With 1 chart.

During the period June 8 to August 8, 1917, from the 43rd brigade of the British troops 315 cases were admitted to hospital. Of these 236 were suffering from fever. In the absence of laboratory methods it was difficult to determine accurately the diagnosis. In rate of importance the fevers could be put down to malaria, most common at Manzal; sandfly fever, fairly frequent at Baji Khal; and a certain number due to the effects of heat, and temporary congestion of the liver. The charts do not show any definite characteristics.

P. W. B-S.

SHEARMAN (C. H.) & MOORHEAD (T. G.). **Bacillaemia due to Infection with** *B. faecalis alkaligenes.*—*Jl. Roy. Army Med. Corps.* 1917. Jan. Vol. 28. No. 1. pp. 104–112. With 3 charts.

The authors describe a small epidemic of cases in which the only likely cause was the *B. faecalis alkaligenes*, proved by isolation of the organism from the blood and by serum reactions. It is probable that under normal conditions this organism may be present and give rise to no clinical symptoms, but in climates where gastro-intestinal diseases are common the catarrhal condition set up may provide a suitable condition for the growth of the organism which then invades the blood stream. Two cases are described in detail and charts of the irregular pyrexia produced are given. The cases under Shearman were treated in the No. 17 general hospital in Egypt. The organism showed little pathogenicity for guinea-pigs and mice.

P. W. B-S.

HIRST (L. F.). **Observations on the Pathogenicity and Specific Characters of the** *Bacillus faecalis alkaligenes.*—*Jl. Roy. Army Med. Corps.* 1917. Oct. Vol. 29. No. 4. pp. 476–487. With 3 charts.

B. faecalis alkaligenes was first described by PETRUSCHKY in 1889 from human faeces and was considered by him to be the causative agent of a typhoid-like illness in man. Since that time it has been frequently isolated, and recently SHEARMAN and MOORHEAD in Egypt have described infections from this organism [see above]. The author at Alexandria has isolated the bacillus from the blood of 12 cases in which the clinical symptoms were more or less characteristic, associated with a pyrexia of moderate severity and duration.

An analysis of the characters of the various strains isolated by PETRUSCHKY, BERGHAUS, KLIMENKO and others is given in a table which is here reproduced. The action on milk and pathogenicity for animals shows considerable variation and CASTELLANI's strain is quite distinct

TABLE II.

AUTHORS.	Petruschky.	Klimenko. (Sub-Group I.)	Straubo Krais. (Strain 1.)	Straubo Krais. (Strain 2.)	Rochaix and Marotte.	Castellani	Shearman.	Hirst.
MOTILITY	+	Variable ..	++	++	++	+	Variable ..	Variable
FLAGELLA . ..	Peritrichal ..	Polar	Polar	Polar	—	—	—	Polar
GELATINE . ..	Not liquefied	Not liquefied	Liquefied ..	Not liquefied	Not liquefied	Not liquefied	Not liquefied	Not liquefied
BOUILLON . ..	Turbid . ..	General turbidity, pellicle deposit	Floccali pellicle	General turbidity, pellicle	General turbidity, pellicle	General turbidity ..	Turbidity slight, pellicle deposit	General turbidity, pellicle deposit
CARBOHYDRATES	Not fermented	Not fermented	Not fermented	Not fermented	Not fermented	Acid in mannite, glucose and dextrose inosite	Not fermented	Not fermented
LITMUS MILK ..	Very blue ..	Blue	Blue	Blue	Very blue ..	Blue	Blue	Blue
MILK	—	Slow clarification	Clarification .	Clarification	Clarification	—	Occasionally peptonized	No clarification, 6 strains after three weeks
INDOL	Negative ..	Negative ..	Negative ..	Negative ..	Negative ..	Negative ..	Negative ..	Negative
PIGMENTATION .	Browning of potato	*Light* brown on potato	*Nil*	*Nil*	—	—	—	Brown on potato, browning of old agar cultures
PATHOGENICITY, INTRAPERITONEAL INJECTION	For guinea-pigs	Not pathogenic to guinea pigs, white mice and rats	Not for guinea-pigs or mice	—	—	—	—	Not for guinea-pigs
AGGLUTINATION BY PATIENT'S SERUM	—	—	To 1 : 1,000	To 1 : 1,000	To 1 : 1,000 1 : 2,000	—	To 1 : 200	To 1 : 50
REMARKS	From description given in Flügge's Text-book	Characters of seven strains from various sources including Petruschky I and II	Strain isolated from blood of a case giving history of dysentery followed by irregular pyrexia	Strain isolated from urine during convalescence of case of irregular pyrexia	Two strains isolated from two cases of benign enteric infection	Characters tabulated in Chalmers & Castellani's Text book	General characters of 11 strains isolated from blood	General characters of 9 strains isolated from blood

The author divides the organism found by him into two strains. In strain 1, motility was greater, reduction of neutral red more rapid, and milk was more frequently clarified than with strain 2. Some of the organisms recorded under the same name are probably different species. The organism is not infrequently present in the faeces under abnormal conditions as shown below:—

Abnormal stools.	Total.	*B. f. a.* found.
Enteric convalescents	43	16
Dysentery ,,	57	29
Normal stools	50	Nil.

Usually the organism is one of low virulence to man, but under favourable conditions produced by some intestinal diseases may rapidly multiply and even gain access to the blood stream through damaged mucous membrane, when it sets up a recognisable clinical condition. It is suggested that the organism may be of use as an indicator of water pollution in Egypt.

P. W. B-S.

KAUNITZ (Paul) & TRAWIŃSKI (Alfred). **Ueber den Befund von *Bacillus suipestifer* im Blute eines kranken Menschen.** [The Isolation of the *B. suipestifer* from Blood of Case.]—*Wien. Klin. Woch.* 1917. Aug. 30. Vol. 30. No. 35. pp. 1098–1099.

From a Russian aged 30 who was admitted to hospital as a case of enteric the authors isolated from the blood on the third day of the disease an organism belonging to the para-typhoid B group, but giving the cultural reactions of the *B. suipestifer.*

The fever was of short duration and spleen enlargement was not noticeable. The blood showed a leucocyte count of 3,000 with a relative lymphocytosis. The organism when tested with immune serum of *para.* "A" and Gaertner showed no agglutination, very slight with *para.* "B," and high with *suipestifer* strains of SCHNUERER & TRAWIŃSKI, while the serum of the patient gave confirmatory results when tested with strains of the same organisms and agglutinated the homologous strain to a titre of 1 in 4,000.

P. W. B-S.

LUDWIG. **Febris palustris remittens.**—*Münch. Med. Woch.* 1917. July 24. Vol. 64. No. 30. pp. 969–970. With 8 charts.

Many irregular fevers have been lately described of indefinite etiology—a disease here called "febris palustris remittens" is the latest addition. The author states that he has observed in the east, 300 cases. The incubation period is three weeks, the course of the fever seven to ten days or less, the pyrexial curve is very remittent in type, and is associated with headache, pain in muscles and weakness, with few objective signs; jaundice and nephritis are not seen and complications are rare. Diagnosis has to be made from febrile catarrh, trench fever and febris quintana. For treatment, antipyretics and quinine are useful but are not specific.

P. W. B-S.

ROCKY MOUNTAIN SPOTTED FEVER.

FRICKS (L. D.). i. **Review of Rocky Mountain Spotted Fever Eradicative Work conducted by the United States Public Health Service in the Bitter Root Valley, Montana, 1915-16.**—*Montana State Bd. Entom.* 2nd Bien. Rep. 1915–16. 1916. Dec. 15. pp. 24–27.

ii. **Rocky Mountain Spotted Fever.**—*Ibid.* pp. 28–34.

It is known that the majority of ticks which transmit spotted fever in the Bitter Root region breed on domestic animals, horse and cattle, as they graze over the foothills during the spring months, and that dipping the animals will not alone eradicate Rocky Mountain Spotted Fever from this region. Therefore the number of these animals should be reduced in every practical way, and the destruction of small rodents in the infected districts is highly desirable. The greatest difficulty in dipping is the weather, a long cold season rendering dipping impracticable, and the expense is out of proportion to the good done.

In a report of laboratory investigation of the virus by the same author, it has been shown that man, Rhesus monkeys, and at least six varieties of small wild rodents found in the region are susceptible to infection, as also guinea-pigs and white rats, while white mice are immune. The virus is transmitted by the bite of wood ticks and recovery is followed by complete immunity. The virus multiplies in the tick and is transmitted to her progeny; it may be propagated indefinitely in guinea-pigs but dies within a few days outside the animal body. It will not pass through the Berkefield filter and most attempts to cultivate it anaerobically have failed. The similarity of the fever to typhus has led to further investigations and ten strains of anaerobic bacilli have been obtained from blood of infected animals, but not so frequently as PLOTZ was able to recover the *B. typhi exanthematici* from typhus cases; the writer however only used 5–10 drops of infected blood instead of 2 cc. These organisms were not pathogenic to guinea-pigs. The author devised a new medium and technique and obtained the following results using only animal inoculations from the cultures and immunity tests. Ninety-seven guinea-pigs were inoculated and afterwards tested with 0·5 cc. of a known spotted fever virus. All the animals injected with cultures less than two weeks old were unprotected. Three guinea-pigs out of ten inoculated with cultures 21–25 days old showed definite lesions of spotted fever or were immune to the active virus injected later. From this it is concluded that a multiplication of the virus occurs in the cultures.

The author was also able by centrifuging infected serum for four to six hours at 2,000 revs. per minute to separate the virus from the supernatant fluid and this sediment of centrifuged infected blood stained with dilute Giemsa showed in the serum many bright red granular bodies, single and in pairs, accompanied by light blue bodies and in the red cells highly elongated chromatin bodies in close approximation to larger light blue bodies; the chromatin body may be 1μ in diameter; the red cells themselves stain normally. These appearances were never found in control specimens and their presence was considered very significant, but as they resemble those described by SEIDELIN in yellow fever which have been said by LOW and WENYON to be found in normal guinea-pig blood the author hesitates to draw any definite conclusions from their presence, but he regards them as probably protozoal in origin.

P. W. B-S.

KING (W. V.). **Report on the Investigation and Control of the Rocky Mountain Spotted Fever Tick in Montana during 1915-16.**—*Montana State Bd. Entom.* 2nd Bien. Rep. 1915–16. 1916. Dec. 15. pp. 13–23.

During 1915–16 the epidemic of Rocky Mountain Spotted Fever had spread from the original area in the Bitter Root valley in Western Montana, a mild though exclusive epidemic being noted in Eastern Montana. The disease is known to be conveyed by the wood tick *Dermacentor venustus*, and efforts have been made to control the spread of the disease by (1), destroying the ticks, (2), removing the natural hosts on which they live, (3), protecting the domestic animals from infection. Very thorough methods were established consisting in the periodic dipping of cattle and horses in disinfectant baths to destroy the engorged adults, and also when this was not possible, removal of the ticks by hand picking. Ground squirrels, which are known to harbour the ticks, were very largely destroyed by poisoning or by shooting; 50 per cent. at least of these rodents have been killed off. It was believed that sheep might prove to be useful in clearing off the ticks, for these become entangled in the wool and die. An experiment with 1,000 sheep in an area of 1,200 acres has been tried but the result is not so far satisfactory, for it was found that the number of ticks which developed on the sheep were more than sufficient to maintain a normal supply. The active period of the adult tick lasts from March to June; therefore during the spring infected pastures should not be used or stock, the animals being kept in tick-free areas. Regulations have been drawn up by the State Board of Entomology, dividing tick infected areas, providing dipping vats and tanks, enforcing a close quarantine on all domestic animals and the premises of persons who fail to bring their animals for dipping, restriction of the movements of animals from infected areas, and prohibiting entrance of animals into any tick controlled districts between February and July.

P. W. B-S.

PARKER (R. R.) & WELLS (R. W.). **Some Facts of Importance concerning the Rocky Mountain Spotted Fever Tick, *Dermacentor venustus* Banks, in Eastern Montana.**—*Montana State Bd. Entom.* 2nd Bien. Rep. 1915–16. 1916. Dec. 15. pp. 45–56.

The conditions present in Eastern Montana were found to differ from those in Western Montana, and the measures adopted for the latter were inapplicable to the former. A special investigation was made, therefore, in this area from March to September, 1916, to control the danger. The country consists of river and creek, valleys and hills; the low land is covered with sage brush and trees are scarce; cotton woods are found along the rivers. Several species of ticks are found, the most abundant being the *D. venustus* which transmits the fever. These vary in number from year to year. In 1915 they were particularly abundant. Horses, cattle and sheep are the domestic animals chiefly raised, and these frequently pasture on the open land and infected areas. Twenty-six species of wild mammals are found; of these the jack-rabbit is an important natural host of the tick, and 66 per cent. were found to be infected, but ticks were also found on many other rodents and on prairie dogs, and it is stated that the latter animal is an efficient larval host under laboratory conditions. Adult ticks are found on horses, cattle, sheep, dogs, cats and pigs, and in 1915 they were commonly found, sometimes in considerable numbers, on men from March to August, but in 1916 they were much less abundant. The residents fully recognise the tick as the transmitter of the disease and exercise care to prevent them becoming attached to their persons. In Eastern Montana, where the hosts both wild and domestic have unrestricted freedom, the infestation in any given area is less severe than in naturally limited or fenced areas, such as the Bitter Root Valley in Western Montana.

P. W. B-S.

CUMMING (James G.). **Rocky Mountain Spotted Fever in California.**—*Jl. Infect. Dis.* 1917. Nov. Vol. 21. No. 5. pp. 509–514. With 4 figs. & 1 chart.

Rocky Mountain Spotted Fever, which is so common in Montana was shown by KELLY to exist also in California [see this *Bulletin*, Vol. 9, p. 65], and he collected the records of 32 cases spread over the last 14 years, but it was not until 1916 that the disease was actually proved there by animal experiment. The author describes and figures two cases in which successful inoculations were made, first into monkeys and then into guinea-pigs. Eighty passages of the virus from the first case are recorded, and this is also being maintained in ticks. The virulence of the virus increases or decreases according to the period of the fever when the blood is taken: if taken on the first day high fever was induced on the second day in the inoculated animal, but if taken at the end of the febrile stage the incubative period could be prolonged 8–10 days. The more prolonged the incubation and the lower the virulence of the toxin, the more pronounced the swelling of the scrotum would be in the injected animal. The author states that this characteristic can be used as a means of differentiating Rocky Mountain spotted fever from typhus, the disease with which it is most likely to be mistaken [but see this *Bulletin*, Vol. 11, p. 141].

P. W. B-S.

RAT-BITE FEVER.

KITAGAWA (J.) & MUKOYAMA (T.) **The Etiologic Agent of Rat Bite Disease. Preliminary Report.**—*Arch. Intern. Med.* 1917. Sept. 15. Vol. 20. No. 3. pp. 317–328. With 2 coloured plates & 4 text-figs.

FUTAKI in 1916 discovered spirochaetes in the blood and tissues of patients suffering from rat-bite disease. The spirochaete was pathogenic to guinea-pigs and could be transmitted from man to these animals direct. The authors add another case to those already brought forward in Japan and give the results of their experiments. Injected monkeys showed fever on the tenth day and guinea-pigs on the eleventh ; white rats were also successfully inoculated. Two types of organisms were obtained, type " A " in guinea-pigs, 6–8μ long, and generally with four to eight curves, and type " B " in white rats generally 3–5μ long with sharper curves and less pointed at the ends, but with practically the same number of spirals. The greatest number of spirochaetes were found in the kidneys. Many more spirochaetes were found in animals from which the spleen had been removed during life than in normal ones. One specimen of type " B " was noted in which two spirochaetes had become so closely connected that they appeared as one specimen undergoing division. By staining, no differential characters were demonstrated between type " A " and " B." The authors hold the view tha in these spirochaete infections the organisms undergo marked but gradual modifications with regard to form and toxicity, and that salvarsan is efficacious in treatment. A number of complement fixation tests were carried out using the ordinary antigen and one made from the heart and liver of guinea-pigs containing spirochaetes. In one case the reaction to the antigen of type " A " proved positive in a case of rat-bite disease. A large number of drawings of the different spirochaetes found are given and two excellent coloured plates. It is doubtful whether these two types represent two different organisms, and a definite opinion cannot at present be given, but it is noted that spirochaetes obtained from inoculation with lymph gland and plasma derived from the same patient appeared to be of different sizes.

P. W. B-S.

KANEKO (Renjiro) & OKUDA (Kikuzo). **A Contribution to the Etiology and Pathology of Rat-Bite Fever.**—*Jl. Experim. Med.* 1917. Sept. 1. Vol. 26. No. 3. pp. 363–375. With 1 chart & 3 plates.

The authors had the opportunity recently in Japan to make a post-mortem examination on a typical case of rat-bite fever and made careful studies of the tissues ; they were able to confirm the work of FUTAKI that spirochaetes are the cause of rat-bite fever. They also came to the conclusion that the long and short type varieties belong to the same species of spirochaetes. Attention was chiefly paid to the supra-renals and kidneys, as ISHIWARA found the organisms mainly in the supra-renals, and it is in these positions in Weil's disease that they are most frequent. They were able to find numerous organisms, particularly in the kidneys, and these were almost exclusively present in the casts in the straight tubes and loops of Henle. In the supra-renals they were in the cortical cells. The forms of the organisms were so varied that at first it appeared as if a variety were present. Two types predominated, a long and a short, but there was every gradation The long forms are 6–10μ long, have numerous small steep irregular waves, and are like the long forms of FUTAKI; the short variety are identical with those described by ISHIWARA, FUTAKI, and IDO. As in Weil's disease, at first the spirochaetes circulate in the blood, while in the convalescent stage following the development of immune bodies they are found in the kidneys, and these antibodies in the course of the illness in man act on the spirochaetes, leaving various irregular so-called degenerate forms. In animals, in which no specific antibodies are found, the spirochaetes retain their typical short form (as found in the blood of patients at the height of the disease, and the typical form of ISHIWARA and FUTAKI in animals). It is noted in confirmation of this that the long forms occur almost exclusively in human tissues. A full description is given of the pathological anatomy of cases of the disease with coloured plates and drawings of the organisms.

P. W. B-S.

TSUNEOKA (R.) **Ueber die Spirochaeta von Rattenbisskrankheit.** [Japanese text.]—*Kyoto Igaku Zassi.* 1917. May. Vol. 14. No. 4. [Author's Summary in German, pp. 46–48.]

The author's observations on two cases of rat-bite fever with animal experiments from them, agree with those of FUTAKI and others in demonstrating that the spirochaete found is the true causative agent of the disease, and that it is infective to man, guinea-pigs, rats, and mice. The organism is found both in the saliva and the urine, and infection can be transmitted by either. A second form of spirochaete is occasionally found in the experimental guinea-pig, concerning which further research is required.

P. W. B-S.

IDO (Yutaka), ITO (Hiroshi), WANI (Hidetsune) & OKUDA (Kikuzo). **Circulating Immunity Principles in Rat-Bite Fever.**—*Jl. Experim. Med.* 1917. Sep. 1. Vol. 26. No. 3. pp. 377–385.

The authors carried out experiments in Japan to determine whether there were present in the serum of patients having rat-bite fever any immunity substances specific for the spirochaetes of the disease. The spirochaetes used were from guinea-pigs which had been infected through the bite of rats and not those obtained direct from men. The serum was from three patients three months or more after being bitten. With dark ground illumination using equal parts of guinea-pig's blood containing spirochaetes and patient's serum the destruction of the spirochaetes was caused, the controls being still active; weaker dilutions of the serum were less or not at all effective. Pfeiffer's test was then carried out using the peritoneal cavity of another guinea-pig. In the test cases the spirochaetes were destroyed but were active in all the controls, and in experimental animals spirochaetes were found in the blood of the controls five days after injection but did not develop in those treated with the serum, thus proving the efficacy of the serum in protecting the guinea-pigs against rat-bite infection The injection of 1–3 cc. of immune serum into infected guinea pigs, intra-peritoneally, intravenously or subcutaneously gave negative results, probably due to the small amount of serum used, but 1 cc. was effective in mice when given intravenously in one, and partially in two given intra-peritoneally. It is therefore evident that the blood serum of convalescents contains antibodies specific against the causative agent of rat-bite fever and the etiology has been definitely established, also that the immune body in the serum during the convalescent stage of rat-bite fever is not equal in efficacy to that contained in the serum of spirochaetosis icterohaemorrhagica.

P. W. B-S.

i. DE MELLO (Froilano) & MENEZES (Caetano Francisco). **Um caso de Sodokú em Gôa.** [A Case of Rat-Bite Fever at Goa.]—*Bol. Ger. Med. e Farmacia.* Nova Gôa. 1917. May. Vol. 4. No. 5. pp. 175–178.

ii. DE SOUSA (Loreto). **Segundo caso de Sodokú em Gôa. (Diagnostico retrospectivo).** *Ibid.* pp. 179–180.

i. A case of rat-bite fever, occurring in a native girl aged 10 years, presenting no features of novelty, except that the child was taken by her parents to a well at a place called Amona, of which the water has a reputation for curing snake-bite. Besides ablutions with the water the body of the patient was rubbed with sandal-wood oil under direction of the priests. The symptoms of the disease naturally subsiding at the end of 45 days, the cure was of course put down by the patient's friends to the hydrotherapy. According to the author, the waters of the well are simply slightly saline.

ii. A presumed case of rat-bite fever in a woman, of which the diagnosis was not made at the time. This patient also received treatment at the holy well above-mentioned, with a similarly favourable result, the symptoms finally disappearing during the course of the cure.

J. B. N.

i. BAIS (W. J.). **Rattenbeetziekte.** [Rat-Bite Disease.]—*Geneesk. Tijdschr. v. Nederl-Indië.* 1917. Vol. 57. No. 3. pp. 357–367. With 1 chart.

ii. PONDMAN (A.). **Een geval van Rattenbeetziekte.** [A Case of Rat-Bite Disease.]—*Ibid.* pp. 368–376.

i. A case of rat-bite disease occurring in a woman, the chief point of interest being that the patient was bitten in the breast during the night by a cat which was hunting a rat. The patient was bitten about the middle of September, and entered hospital with the usual symptoms of the disease on the 17th of October. The course of the case is shown in a chart. Two injections of neo-salvarsan were given, the first of 600 and the second of 900 milligrammes, at a week's interval, with the result that the temperature fell steadily to normal after the second injection. All symptoms had disappeared by the 27th November.

ii. A case of rat-bite disease in a man who was bitten in the thumb by a rat. The symptoms were of the usual character. After a single injection of 500 mgm. of neo-salvarsan the temperature dropped to normal, permanently.

J. B. N.

NIOWAKA (I.), YOSHIZAWA (I.) & MUMEMOTO (E.). **[Spirochaetosis in the Guinea Pig.]**—*Tokyo Iji Shinshi* (*Tokyo Med. News*). 1917. Jan. 20. No. 2007.

[From Review by R. G. MILLS.]

From the blood of guinea-pigs suffering from an epidemic disease, the authors isolated a spirochaete which was assumed to be the causative agent. Injections of cultures of this organism into healthy animals caused alopecia of the circumocular and dorsal regions. These symptoms were noticeable features in the naturally infected animals. Intraperitoneal or subcutaneous injection of blood from infected animals, or subcutaneous injection of an extract of infected organs, caused a rise of temperature in from 3–7 days. The animal was acutely sick during this febrile period and until the temperature regained the normal level. After an interval a second period of pyrexia occurred. Immediately after the paroxysm the number of organisms present in the blood was increased. Experimentally, the infection was transmitted :—

1. By causing an infected animal to bite a healthy one.
2. By the injection of saliva from an infected guinea-pig beneath the skin of a healthy animal.
3. By caging a healthy and sick animal together.

In this last case no lesion could be found by means of which entry of the organisms had taken place; and it was assumed, since the organism is present in both the urine and faeces of infected animals, that transmission of the parasite had been brought about by this agency.

The authors consider that this organism is the same as that causing rat-bite fever and they state that its morphology, immunological reactions and the results obtained from animal experiments prove it to be identical.

R. P. Cockin.

IZUMI (G.) & KATO (M.). **[Cat-Bite Disease and its Pathogenicity.]**—*Tokyo Iji Shinshi* (*Tokyo Med. News*). 1917. Apr. 28. No. 2021. pp. 1–6.

[From Review by R. G. MILLS.]

Cat-bite disease in Japan was first described by FUJIDA & SATO in 1902. Since that time records have been gradually accumulating and now the authors bring forward proof that it is identical with rat-bite fever, at least as far as its causal organism is concerned. The clinical history of the cases is very similar to those usually described as rat-bite fever, an incubation period of 10 days to 2 or 3 weeks, premonitory symptoms, then fever, infiltration of the skin, lymphatic implication, pains in the joints and muscles, and enlargement of the spleen. The fever is of a relapsing type, the intervals being 3–9 days. Maculae appear first in the area of the bite, then on the limbs. The part bitten often heals with a small scar, or it may ulcerate, sometimes deeply. The prognosis is generally good except in cases of extreme age or in debilitated persons. The course is generally 2 to 3 weeks if there is proper treatment; if not it may extend over months. Salvarsan has given the best results. FUTAKI & ISHIHARA each discovered a spirochate in the cases, and this has been confirmed by IDO, ITO, WANI, and OKUDA.

To determine the relationship of the spirochate the authors carried out some serum experiments and found that the serum of a cat-bite fever case when mixed with an equal part of guinea-pig blood containing rat-bite fever spirochates caused complete loss of activity, whereas controls with normal serum and syphilitic serum were unaffected. The agglutinating power is however quite weak and not seen in a dilution of 1 in 2 of the serum. One cc. of guinea-pig blood rich in rat-bite spirochaetes mixed with 2 cc. of the patient's blood was injected into the peritoneal cavity of a guinea-pig and removed after an hour; no organisms were found, but in a control experiment using normal serum the spirochaetes were abundant and motile. The guinea-pig in the first experiment remained healthy; the latter died and its blood contained motile spirochaetes. The identity of the organisms in rat-bite and cat-bite disease appears, therefore, to be established.

P. W. B-S.

KITAGAWA (J.). [**Clinical Experience with Cat-Bite Disease.**]—*Saikingaku Zasshi.* (*Jl. Bacteriol.*). 1917. May 15. No. 260. pp. 422–423. [From Review by R. G. MILLS.]

The author, who treated two cases, considers this disease to be a spirochaete infection similar to that due to rats. The spirochaetes were found in the blood of both cases. Guinea-pigs inoculated from the patients became infected and one bitten by the cat that had caused the original infection also developed spirochaetes in the blood.

JAPANESE RIVER FEVER.

MIYAJIMA (M.) & OKUMURA (T.). **On the Life Cycle of the "Akamushi" Carrier of Nippon River Fever.**—*Kitasato Arch. Exper. Med.* 1917. Apr. Vol. 1. No. 1. pp. 1–14. With 3 plates, 2 text-figs. & 1 chart.

The Nippon River fever, "tsutsugamushi disease" or Kedani fever has long been known to be associated with the presence of a small mite, the Akamushi or, as the authors now call it, *Leptus Akamushi*. These parasites are very difficult to rear but this has now been successfully carried out from the egg to the fertilised imago. The paper contains very full descriptions of the mite in all its stages, the technical details of which are too long to attempt to summarise, but are well shown in the excellent coloured plates and figures The mature female appears to lay only one egg at a time. The larva, with six legs, attaches itself to warm blooded animals, particularly field mice, for three or four days; it then shelters under the ground and in five or six days becomes the eight legged nymph which closely resembles the mature tick. The nymph requires moisture and is not parasitic, feeding on vegetable juices. After ten weeks in captivity the nymphs became imagines which are considerably larger than the nymphs; these also feed on the juices of plants. Twenty-eight laboratory hatched larvae were put upon a Japanese monkey and these remained attached for three or four days. Only two of the localities bitten showed changes, inflammation and ulceration followed by enlarged glands in seven days; the animal suffered from a smart attack of fever when it was very ill, but there was no exanthem characteristic of the human disease. This experiment is stated to confirm the mite theory of the transmission of tsutsugamushi disease established by KITASHIMA & MIYAJIMA in 1908.

P. W. B-S.

HAYASHI (N.). **[Studies on the Pathogenesis of Flood Fever, Tsutsugamushi.]** — *Saikingaku Zasshi.* (*Jl. Bacteriol.*). 1917. Feb. 10. No. 257. pp. 151–152.

[From Review by R. G. MILLS.]

The author claims that the virus transmitted by the Trombidium (mite) is a piroplasm. Monkeys, guinea-pigs, and calves were inoculated from the patient and the blood, lymph, glands, and other organs were stained by Giemsa. In all, large giant cells were found in which were seen three kinds of granules, rod shaped masses, globular forms and annular masses, but transitional specimens were met with. The rod shaped forms were most common in the lymphoid tissue of the guinea-pigs.

P. W. B-S.

RELAPSING FEVER.

NUTTALL (George H. F.). **The Part played by *Pediculus humanus* in the Causation of Disease.**—*Parasitology.* 1917. Nov. Vol. 10. No. 1. pp. 43–79. With 1 plate.

After a chronological and critical account of the contributions of various workers to the solution of the problem of the transmission of relapsing fever Professor Nuttall gives an excellent summary. As the facts are by no means well known and have been wilfully or ignorantly misrepresented, it is reproduced in full:—

"Epidemiological evidence, as in the case of typhus, points to relapsing fever being louse-transmitted. The two diseases occur under like conditions: personal filth and squalor, the close contact of persons through overcrowding, facilities being offered for the propagation of lice by the continuous wearing of clothing day and night for weeks or months on end. All recently collected evidence (from India, North Africa, Germany, Russia and Serbia) proves that lice are constantly present on infected persons. These remarks apply equally to typhus, which, as already stated, may coexist with relapsing fever in epidemic form. Judging from the accessible records, relapsing fever appears to be somewhat more restricted than typhus in its geographical distribution. It has been conclusively demonstrated by carefully conducted experiments that *Pediculus humanus* serves as a carrier of *Spirochaeta recurrentis* the causative agent, from man to man.[*]

"When lice imbibe infected blood, the spirochaetes disappear rapidly from their alimentary canal and are not discoverable even by the ultramicroscope for a period of about 2–6 days after the insects have fed. The spirochaetes reappear in the coelomic fluid of the lice usually on the 8–9th day. They at first appear small, but, as time proceeds, they attain the dimensions and appearance they possess in human blood during the attack. When lice feed on infective blood, the number of insects that become infected with spirochaetes ranges from 10 to 42 per cent. The spirochaetes are hereditarily transmitted in the louse, for the offspring of an infected female has been shown to be infective. This persistence of the spirochaetes in the louse no doubt serves to maintain them in nature. It has only been through the successful raising of lice under laboratory conditions, coupled with the use of monkeys and occasionally man for infection experiments, that it has been possible to demonstrate the phenomena herein described.

"Although lice may be infective for a few hours after they feed on relapsing fever blood, it is probable that infection will rarely occur by their transference from man to man soon after feeding. When a louse has fed, it usually remains quiet, whilst digesting its meal. When lice have hungered for any length of time, as we have frequently observed, they feed to excess and take a longer time to digest the large amount of blood imbibed. If such lice are kept cold the process of digestion is impeded, and I have no doubt that any spirochaetes which they may harbour will remain virulent for longer periods, as I found was the case in bugs. How long gorged lice may remain infective at a low temperature remains to be determined. The experiments herein recorded point, however, to a rapid loss of infectivity in lice under ordinary conditions prevailing after an infective meal. The spirochaetes vanish in lice in which they subsequently reappear. Just before their reappearance, usually on the sixth day, but at times on the third to the fifteenth day, the lice have been found to be most infective. The infectivity of the louse does not depend upon the presence in its body of visible spirochaetes, in fact when spirochaetes reappear and attain their full size the lice are non-infective (Nicolle). This, coupled with the observation that human blood is infective during the apyrexial stage when spirochaetes cannot be found in the blood (Sergent and Foley), certainly bears out the view which I have upheld with others, that spirochaetes are Protozoa, for they obviously undergo a cyclical development in both the vertebrate and arthropod hosts. Nicolle advances the view that the typical spirochaete is incapable of multiplication or that it rarely divides, and that multiplication and consequent infectivity are entirely or largely confined to the minute forms which may coincide with the "coccoid bodies" of some authors, assuming that they are not ultramicroscopic.

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[*] "Töpfer [*Munch. Med. Woch.* 1916. Vol. 63. p. 1571] has the temerity to state that the work of Sergent, Nicolle, and their colleagues, is not 'einwandsfrei.' He then proceeds to repeat their work. A few comparatively trivial experiments are described which are merely confirmatory, but in his opinion (!) afford the first demonstration that lice convey relapsing fever. Töpfer's behaviour in this matter, flatly speaking, is thoroughly dishonest."

"It has been proved that lice do not convey relapsing fever by their bites. As Nicolle and his colleagues have shown, persons may be bitten many thousands of times by infective lice with impunity. Infection takes place through the lice being crushed upon the skin which is commonly excoriated by the self-inflicted scratches of the individual harbouring the lice. Infective material may, moreover, be carried on the fingers to the nose or eye, and it has been demonstrated experimentally that the spirochaete is capable of invading the system through intact mucous membranes.

"The period of incubation, under experimental conditions, as observed in man and monkeys following infection through the excoriated skin or intact mucous membrane, is 6–8 days, when crushed lice in the infective stage are used. This corresponds with clinical experience. A single infective louse, crushed upon the excoriated skin, has produced relapsing fever. Persons have been experimentally infected by placing infected lice upon their persons without their knowledge. Happily for these subjects and for the experimenters who intentionally infected themselves, the course of the disease can be cut short by the arsenical treatment discovered by Ehrlich."

A. G. B.

MAYER (Martin). **Zur Uebertragung des Erregers des europäischen Rückfallfiebers (Febris recurrens) durch die Kleiderlaus. Bemerkungen zur gleichlautenden Arbeit von Prof. Jos. Koch in Nr. 34.** [Transmission of European Relapsing Fever by the Clothes Louse.]—*Deut. Med. Woch.* 1917. Sept. 27. Vol. 43. No. 39. p. 1231.

KOCH (Jos.). **Zur Uebertragung des Erregers des europäischen Rückfallfiebers durch die Kleiderlaus. Bemerkungen zu den Ausführungen des Herrn Prof. M. Mayer.**—*Ibid.* Nov. 1. No. 44. p. 1394.

M. Mayer writes from the Tropical Institute at Hamburg in criticism of J. KOCH's article summarised in this *Bulletin*, Vol. 10, p. 268. Koch shows ignorance of the work which has established the transmission by the clothes louse. The spirochaetes disappear from the louse's stomach 6–10 hours after the feed and reappear in the coelomic cavity at the end of the first week, at which time they are infective (North African form: NICOLLE, BLAIZOT & CONSEIL); or they can be seen from 24 hours to the eighth day in the coelomic cavity (TOYODA: European form). Examination of "wild" lice from infected patients yields no reliable information; experiments are needed on the lines of F. K. KLEINE's in sleeping sickness. Three of Koch's six figures show spermatozoa and not spirochaetes.

Koch replies without seriously disputing Mayer's contentions.

A. G. B.

van Hoof (L.). **Note préliminaire sur la fièvre récurrente parmi les troupes belges dans l'Est Africain Allemand.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 786-791. With 4 charts.

The complications seen in more than 100 cases were—conjunctivitis; amaurosis with signs of retinitis; iritis and irido-cyclitis; headache resembling that of syphilis and responding to mercurial and arsenical treatment; meningism with stiffness of neck and Kernig's sign; progressive loss of intelligence and of memory; paresis of the lower limbs with spasticity and sometimes Argyll-Robertson's sign; recurrent myocarditis followed by death in every case; dysentery yielding to appropriate treatment, but not to emetine. [There is no indication of the relative frequency of these complications.] The author finds the leucocyte formula useful in diagnosis. There is an increase of basophiles, neutrophile myelocytes, young neutrophiles, metamyelocytes, and large mononuclears at the expense of the neutrophiles with segmented nuclei and the small lymphocytes. Some case histories are given. As to treatment, salvarsan and its substitutes, given when the temperature first rises, may cut short an attack but later, neither these nor antimony have much effect. Mercurial salts are then indicated; the author uses salicylate of mercury in aqueous solution by injection, with rapid and lasting benefit.

A. G. B.

i Armand-Delille (P.), Gassin & Lemaire (Henri). **Les principaux caractères de la fièvre récurrente observée à l'armée d'Orient.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. June 28. 3 Ser. Vol. 33. No. 21–22. pp. 778–780.

ii. Portocalis. **Sur l'épidémie de fièvre récurrente observée récemment en Macédoine.**—*Ibid.* pp. 780–783.

i. The cases seen—apparently about fifty—were sporadic among the French troops, an epidemic having been averted by measures of "epouillage." The points noted were as follows:—

1. The disease was benign; one death only occurred.

2. The onset was abrupt.

3. With the disease established there were always sharp pains in the lower limbs.

4. The liver was always palpable; in 30 per cent. of cases there was jaundice.

5. The spleen was rarely much enlarged.

6. In some cases there was not only severe headache but Kernig's sign and lymphocytosis of the cerebro-spinal fluid.

7. After the first crisis, headache, subicterus, and pain often persisted: there was never a period of euphory.

8. There was generally not more than one relapse; a second was seen in 10 per cent. of cases.

9. The symptoms of the relapse were those of the first attack.

10. The only complications were haemorrhagic—subconjunctival, epistaxis, melaena.

11. The spirochaete was found in all the cases, never during the apyretic intervals and often not during the first three days of fever.

12. With the crisis, which always ended in hypothermia, there was a lowering of both maximal and minimal tension, whereas in malaria the minimal only is lowered.

13. This disease and malaria are often associated. The spleen is then tender and often enlarged.

ii. There were about 800 cases among the Greek troops and many among the civil population, to whom it was introduced during the Balkan Wars. Portocalis notes as symptoms of cardinal importance, the musculo-articular pains, the insomnia and the lucidity of mind present throughout. In some of his cases symptoms of meningeal reaction such as Kernig's sign were present, but never any change in the cerebro-spinal fluid; in no instance were spirochaetes found there. Epistaxis was sometimes so free as to necessitate plugging of the nares. The urine always contained true albumin and nucleo-albumin precipitable by acetic acid, very rarely casts and red blood cells. The primary attack lasted 5–7 days, the interval which followed 8–10 days, the relapse 3–4 days. One attack only was observed in 14 per cent. of cases. Owing to the occurrence of atypical forms the use of the microscope is essential. Two instances of death were met with, both due to suprarenal deficiency. Thanks to measures taken relapsing fever is now almost extinct in Macedonia.

A. G. B.

Duchamp (C. J.). i. **Fièvre récurrente: paludisme consécutif.**—*Presse Méd.* 1917. Apr. 12 Vol. 25. No. 21. pp. 210–211 With 3 charts.
ii. **Contribution à la pathologie des Balkans. La fièvre récurrente des Serbes.**—*Bull. Acad. de Méd.* 1917. Mar. 13. 3 Ser. Vol. 77. Year 81. No. 11. pp. 372–373.

In these papers Duchamp calls attention to the fact that attacks of malaria may follow upon relapsing fever and simulate relapses of that disease. The temperature charts, which he gives as illustrations of this observation, were controlled by microscopical examination of the blood. Relying upon the charts alone, these spurious relapses might conceivably mislead a careless observer.

Duchamp states that latent malaria may be lit up for the first time in the above circumstances and the observation is of importance to those working in localities where relapsing fever is endemic.

R. P. Cockin.

Duchamp (J. C.). **Contribution à la Pathologie des Balkans. La fièvre spirochéto-plasmodique des Serbes.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 827–834. With 3 charts.

By spirocheto-plasmodic fever of the Serbs the author means cases in which both parasites are found simultaneously and he seems to suggest that this is peculiar to the Balkans. He believes too that it has not been previously reported [It is common enough in Central Africa.] He describes in more or less detail six cases and gives three charts. Laveran, in the discussion, said that he preferred the term associated relapsing fever and malaria and that the clinical types described were neither new nor peculiar to Serbia.

A. G. B.

KUELZ (L.). **Beiträge zur Pathologie und Therapie des Rückfallfiebers.** —*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. June. Vol. 21. No. 11–12. pp. 181–188.

The author gives his impressions of relapsing fever as seen in German soldiers, in Turks on the Persian front, in Rumanians in Macedonia, Serbia and the Dobrudja. Whereas of the Germans there died only one man and of the Turks 8 per cent., the Rumanians—nearly all prisoners—died in numbers, in some formations up to 60 per cent. [but the respective figures are not given]. The so-called relapsing fever oedema was seen very rarely among the Germans, more commonly among the Turks, and in over one-third of the Rumanians. Intestinal complications—diarrhoea or dysentery with blood—occurred in the same relative proportions; many Rumanians died from this cause. Similarly, whereas a dose of 0·45 gm. neo-salvarsan was almost always effective with the Germans and Turks, in the case of the Rumanians failures were numerous, in the experience of one physician 35 per cent. A discussion follows of the causes of these differences. Opposing views are held as to the cause of the intestinal symptoms and the oedema, one school considering these to be symptoms of relapsing fever, the other of dietary deficiency. Kulz shows that whereas the Germans had their usual food and the Turks in Persia nearly all that they were accustomed to, the Rumanians failed to get the maize and maize products which are to them what rice is to the Chinaman. It has moreover been proved, he says, that when these products are supplied the symptoms fail to appear; and oedema is not peculiar to relapsing fever cases but occurs also in Rumanians suffering from various other diseases. It is a symptom of lack of vitamines. The practical application is that in relapsing fever strict attention should be paid to the diet as well as to drug treatment. This experience also goes to show that with salvarsan it is not merely a matter of blood sterilisation, for if so the Rumanians should have done as well as the Germans.

With regard to transmission, whereas by strict measures against lice typhus could be and was stamped out, relapsing fever on more than one occasion continued to occur, so that the author concluded it was being spread by other means, and he suggests fleas.

Lastly a symptom is described by which the presence of relapsing fever can be detected early—the gait of the patient—which is characteristic from the first days or even hours. ‘The patient moves slowly and heavily with steps which seem to cleave to the ground . . he is insecure and seeks for support . . . it is as if the trunk were too heavy for the legs.” This typical gait depends on affection of the calf muscles, and may also be seen in scurvy. Familiarity with it enables one to distinguish between commencing relapsing fever and commencing typhus, in which prostration is not seen till the third day. Ambulatory typhus is often seen, ambulatory relapsing fever never.

A. G. B.

GALLI-VALERIO (B.). **La bronchite à spirochètes ou Spirochaetiasis bronchialis (bronchite de Castellani).** — *Correspondenz-Blatt d. Schweiz. Aerzte.* 1917. Feb. 10. Vol. 47. No. 6. pp. 169–175. With 1 text-fig.

Galli-Valerio considers that the evidence goes to prove that a specific bronchitic spirochaetosis exists. He is not, however, prepared to agree with FANTHAM that the causative agent is not a spirochaete of the mouth; but considers that the number of spirochaetes present in the sputum of infected patients points to specific infection by those organisms. The spread of the disease is brought about by means of infected sputum, and the writer quotes FANTHAM as stating that desiccated sputum is a fertile source of infection because of the relatively resistant coccoid forms of the parasite which are contained therein

The incubation-period of the infection is given as from 24–30 hours. This is followed by a sharp attack of fever, in which the temperature rapidly mounts to 39°–40° C. Fits of coughing and abundant expectoration of yellowish, viscous sputum—which is occasionally nummular—are the usual symptoms of the disease. Percussion reveals no special features and auscultation only disseminated rales. Vocal resonance may be normal or increased. The examination of the blood demonstrates a diminution of haemoglobin and erythrocytes; whilst a manifest leucocytosis is present. The writer recommends that the condition be treated by injections of salvarsan or neo-salvarsan and that the patient be confined to bed. MACFIE is quoted as having administered creosote in these cases with good results.

R. P. C.

VON HOESSLIN (Heinrich). **Zur Klinik des Rückfallfiebers.**—*Münch. Med. Woch.* 1917. Aug. 14 & 21. Vol. 64. Nos. 33 & 34. pp. 1065–1068; 1106–1109. With 16 charts.

A long clinical paper based on the study, on the Eastern front, of 50 carefully observed cases and 170 seen once or more times. The symptoms are described in much detail with illustrative charts A few points are selected here for mention. Oedema of the skin was not seen at all though some have regarded it as a frequent symptom; it is remarked that the patients had received a sufficient ration of bread and meat. Haemorrhages are regarded as characteristic, usually just before or during the crisis, and most commonly from the nose. All the patients complained of loss of taste. The pains in the limbs were regularly present, most often in the shin bones and the calves, which were usually tender to pressure. It was not always possible to find spirochaetes. [On several of the illustrative charts negative search is recorded.] The author suggests that there are vectors other than lice, without however bringing forward any evidence.

Several anomalous cases are described in which diagnosis was difficult, and in some of these it is noted that spirochaetes were not found; two cases ended fatally with lung complications; the charts show all types of fever, some quite irregular. [It is permissible to suggest the co-existence of malaria in some instances; it does not appear that its possible presence was considered.] Diagnosis is treated at a length which it would be tedious to follow. Owing to the pain in the bones, joints and muscles acute rheumatism has often been diagnosed; osteomyelitis has even been suspected. Other diseases discussed are—sciatica, bronchial catarrh and broncho-pneumonia, influenza, typhoid, spirochaetosis icterohaemorrhagica, dysentery, typhus (differentiated by the " Weil-Felix " reaction), five-day fever and malaria. The author has not had the 90–95 per cent. of successes with salvarsan that other German authors claim and he points out that in more than half the cases the disease comes to an end after one relapse, and after a first attack as many as 13 per cent. of cases may recover spontaneously. A. G. B.

Wiener (E.). **Atypische Rekurrensfälle.**—*Arch. f. Schiffs- u. Trop-Hyg.* 1917. July-Aug. Vol. 21. No. 14–15. pp. 237–266. With 1 text-fig. & 39 charts.

The feature of this paper is the temperature charts wherein are indicated under the appropriate dates the finding of spirochaetes and of malarial parasites. The observations were made in autumn-spring 1916–17 in South Albania on 226 cases and the symptoms differed in nearly all from those usually attributed to the European type of relapsing fever. It is believed that the disease is endemic among the Albanians. The parasite was carefully studied and a series of figures illustrates the various forms it took ; its length was 14·2–46μ, breadth 0·5μ, larger dimensions than those of other species; the number of curves was 4 to 12. The atypical cases are classed in two groups according a they were unmixed or complicated by some other affection, usually malaria, which was present in more than half the cases ; in unmixed cases there were rarely more than one or two attacks. Sometimes the parasites were found with the spirochaetes, sometimes in preceding bouts of fever, sometimes in succeeding bouts, and naturally the charts have very different appearances. In a few cases spirochaetes were found in the fever-free intervals, especially it seems in under-nourished prisoners Such cases are regarded as important as by means of them the disease might be introduced unawares.

Of the 226 there died 40, or 17·7 per cent. In the majority the autopsy showed dilatation of the heart, usually with degeneration of muscle and in some cases pin-head haemorrhages on the endocardum ; in 25 per cent. there was terminal broncho-pneumonia, and in half the cases nephritis. Splenic enlargement, always present, could not be put to the account of relapsing fever only ; the liver was invariably increased. Dysentery was present infrequently, chiefly among Rumanian prisoners. Changes in the brain and marrow are mentioned. The skin was yellow in 85 per cent. of cases, and in many there was icteric pigmentation of the liver and kidneys. In 10 per cent. on both sides of the trunk were haemorrhages from a hemp seed to a pin's head in size. Spirochaetes were invariably found in the spleen.

Arrhenal, tried in 83 cases, was useless. Neosalvarsan, 0·6 gm. intravenously, was successful except in two cases, the parasites disappearing 6–36 hours after the injection [the number of cases so treated is not stated]. Spirochaete containing blood was injected into rats, bats, hens, pigeons and ravens but only in one raven with success. The fate of the organisms was studied in the peritoneal cavity of the animals. In the raven spirochaetes were found in the bile a week after injection, when the bird succumbed. A. G. B.

Parrot (L.). **Du délire et des réactions psychomotrices dans la fièvre récurrente algérienne.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 692–694.

Dumolard, Aubry & Torre (1914) recorded psychical symptoms. mental confusion usually with delirium, in 14 out of 17 relapsing fever cases seen in Algeria [see this *Bulletin*, Vol. 5, p. 232] and more recently POROT (1917) noted delirium in four cases in that country. Parrot in an experience of 22 cases in various races and parts of Algeria finds acute delirium to be extremely rare; in all his patients the mind was clear throughout. In this opinion he is supported by SERGENT and FOLEY [*Ann. Inst. Pasteur*, 1910, p. 339].

A. G. B.

DUDGEON (Leonard S.). **Examination of the Urine in Cases of Relapsing Fever occurring in Macedonia.**—*Lancet.* 1917. Dec. 1. pp. 823–825. With 1 text-fig.

The urine was examined in 100 cases and "the spirochaeta of relapsing fever" was met with in 27 out of 89 cases in which it was sought (30·3 per cent.); it is suggested that in such cases the urine may be infective. The urine in every case was centrifuged, and films were made of the deposit. For the spirochaetes the Levaditi process gave the best results. In the majority of cases albumin was present in the clear urine. Casts were usually found, especially hyaline and granular; epithelial and leucocyte casts were common; red cells and leucocytes were "very numerous on many occasions." Distinct improvement usually occurred in the urine after the intravenous injection of 0·25 gm. kharsivan, which was the routine treatment, not contra-indicated by albuminuria. The spirochaetes found in the blood "showed several coarse spiral turns and numerous figures of eight" and had a great affinity for the ordinary stains. In five instances spirochaetes were found in the urine before their discovery in the blood. Bile pigment was always absent and true jaundice was not noted. A short account is given of one autopsy.

In an addendum reference is made to papers by STODDARD and PATTERSON (*Brit. Med. Jl.*, Sept. 29). STODDARD found spirochaetes in 46 of 100 persons in the male urethrea without signs of relapsing fever and believes that these spirochaetes are a source of contamination in uncatheterised urines. Dudgeon notes however that it is the appearance in the urine of albumin, red cells and casts which is so important in relapsing fever. He considers that warm urine is the best flush for the urethra and has discarded catheters for bacteriological purposes.

Guinea-pigs inoculated with relapsing fever urine failed to become infected.

A. G. B.

i. MUEHLENS (P.). **Arsalytbehandlung, besonders beim Rückfallfieber.** [Treatment by Arsalyt in Relapsing Fever.]—*Deut. Med. Woch.* 1917. Sept. 13. Vol. 43. No. 37. pp. 1167–1168.

ii. KOSTOFF (K. H.). **Arsalytbehandlung beim Rückfallfieber.**—*Ibid.* pp. 1168–1169.

i. The action of arsalyt (dimethylamino-tetramino-arsenobenzol) was first tested in spirochaetosis by GIEMSA (1913) [see this *Bulletin*, Vol. 2, p. 145]. Later the author with GELHAAR employed it in malaria [*loc. cit.*, Vol. 4, p. 292]. During the present war he has used it with success in Turkey and in Bulgaria for relapsing fever. The drug is available in solution in ampoules and is injected intravenously by a technique which is detailed. Its action is at least equal to that of neo-salvarsan and the solution is always ready for use.

ii Kostoff records its employment in 32 severe cases in doses of 0·4 to 0·5 gm.; 24 were in the first and 8 in the second attack. In 28 cases there was no further attack; the temperature came down in 4–20 hours and the spirochaetes disappeared. Similar results were obtained in 13 cases treated with neo-salvarsan, but the action on parasites and temperature was less swift.

A. G. B.

TOYODA (S.). [**Second Report on the Spirochaete causing Relapsing Fever in Manchuria.**]—*Saikingaku Zasshi.* (*Jl. Bacteriol.*). 1917. Apr. 20. No. 259. pp. 301–315. With 8 illustrations.
[From Review by R. G. MILLS].

For the determination of the method of fission a slide of the organism in the blood of a rat was made using osmic acid as the fixing solution, thus producing a stouter and more deeply stained body than is possible with alcohol. Both transverse and longitudinal division were seen. Preparations were made from cultures in the same manner by mixing equal parts of culture material with osmic acid solution, drying and then staining with Giemsa. The form of the organism was the same but the size was slightly smaller. No evidence of transverse fission was seen.

The animal inoculations of strains WANG and TAM were continued through more than 30 passages and the characteristics were unchanged. During the autumn of 1916 serum was obtained from 8 patients who had recovered from the infection and their agglutinative power tried on the strains Wang and Tam. Only 2 of the 8 affected the Wang strain and none influenced the latter. In all 9 cases were treated in 5 different mines of the Fushun coal company; 3 were of the Wang strain, 2 were related to the Tam and 4 were entirely different. It is evident therefore that there was no special strain, affecting any particular labourers' camp, which was being conveyed from one to another. [For summary of First Report, see this *Bulletin*, Vol. 10, p. 271.]

A. G. B.

MACFIE (J. W. Scott). i. **The Morphology of Certain Spirochaetes of Man and Other Animals.**—*Ann. Trop. Med. & Parasit.* 1916. Dec. 16. Vol. 10. No. 3. pp. 305–343. With 6 charts & 6 text-figs.

ii. **The Measurements of Length of** *Spirochaeta marchouxi.*—*Report of the Accra Laboratory for the Year 1916.* 1917. London: J. & A. Churchill. pp. 54–56. With 1 chart.

i. Only the contents of this paper can be indicated here. Spirochaetes from the vagina, bladder and throat of three natives of the Gold Coast are described and compared with known species. The vaginal spirochaete is described as *S. vaginalis*; its length was most commonly 7–10μ. The author discusses the means of distinguishing the smaller spirochaetes and concludes that length is the most promising morphological character. He suggests drawing a large number by the aid of a camera lucida, measuring the drawings and plotting the results on a curve, as has been done with trypanosomes. He has followed this method in this paper.

ii. The author has made similar measurements of *S. marchouxi* the parasite of fowls, the only blood-inhabiting spirochaete available to him. He measured 300 and gives a chart of the result. The commonest lengths were between 9 and 11μ. As compared with the curves of the extra-vascular spirochaetes previously measured "the curve is longer and lower, the crest is less well marked and a smaller proportion of the parasites falls within the commonest length range. This difference is probably due to a delay in the separation of the daughter parasites in the blood."

A. G. B.

SANGIORGI (Giuseppe). i. **Sulla cultura** *in vitro* **degli spironemi dell' intestino umano.** [The Cultivation *in vitro* of the Spironemata of the Human Intestine.]—*Pathologica.* 1917. Feb. 15. Vol. 9. No. 198. pp. 61–62.

ii. **Sugli spironemi dell' intestino umano coltivati** *in vitro*.—*Ibid.* Sept. 1. No. 211. pp 229–230. With 1 text-fig.

i. The author, having had occasion to examine the stools of a large number of soldiers for the presence of cholera bacilli, finds that Dunham's peptone-water makes a good culture medium for the Treponemata of the human bowel. It is, however, necessary that the medium should become anaerobic by the development of a superficial pellicle of bowel bacilli which will consume the oxygen in the solution. In taking samples for examination or transplantation, which should only be done once in every four days or so, the platinum loop should be passed down the side of the tube so as to disturb this pellicle as little as possible. The addition of small portions of rabbits' kidney, as recommended by TAROZZI, improves the medium.

ii. A short note describing involution-forms occurring in spirochaetes cultivated in peptone water. After 20 subcultures, during which the spirochaetes retained their normal appearance, involution-forms began to appear characterized by swelling, vacuolization, and reduction in the number of spirals. At each successive subculture the number of these involution-forms increased. Their appearance is shown in the illustration.

J. B. Nias.

NOGUCHI (Hideyo). i. *Spirochaeta icterohaemorrhagiae* **in American Wild Rats and its Relation to the Japanese and European Strains. First Paper.**—*Jl. Experim. Med.* 1917. May 1. Vol. 25. No 5. pp. 755–763.

ii. **Spirochaetes.**—*Jl. Lab. & Clin. Med.* 1917. Mar. & Apr. Vol. 2. Nos. 6 & 7. pp. 365–400; 472–499. With 3 charts.

i. In this paper Noguchi announces that he has been successful in isolating *Sp. icterohaemorrhagiae* from the kidneys of American wild rats. The rats were obtained from the vicinity of New York City and the strain of spirochaete isolated, when injected into guinea-pigs.

produced death within 9–12 days. The disease in these animals was characterised by " marked jaundice, cholemia, choluria and extensive haemorrhages into the various viscera."

" The morphology of the spirochaete corresponds with that of the Japanese and Belgian strains " with which Noguchi was able to compare it It is described as " a closely wound, slender, cylindrical thread with gradually tapering ends, averaging 9μ by 0·25μ " In cultures, " individuals of 3–4μ or 20, 30 and even 40μ are met with." The number of coils is stated to be greater, in a given length, than in the case of any known spirochaete. " It is so closely wound that within 5μ there are 10 to 12 coils. Near the extremities, the coils become closer." The organism " is devoid of a terminal filament, such as is characteristic of a spironema or treponema, and is resistant to saponin (10 per cent.), unlike all other spirochaetes." Noguchi considers that it calls for a new genus and suggests the name *Leptospira*, because " of its fine and minute windings."

For diagnostic purposes, in human cases, the author recommends the following media :—

(a) 1 part rabbit serum, 3 parts Ringer solution (or 0·9 per cent. sodium chloride solution) and ½ part of citrate rabbit plasma. The whole covered with a thin layer of sterile paraffin oil.

(b) The same as the above, except that ½–1 part of neutral or slightly alkaline agar (2 per cent.) is added " while in a liquid state and quite hot (60°–65° C.) in order to get a uniform mixture of the agar."

These culture media are inoculated with the suspected blood " by introducing a quantity which is regarded as adequate in each instance." Growth takes place at 30°–37° C. and in 48–72 hours the spirochaetes may be found immediately below the surface (1·0–1·5 cm.). Noguchi states that " the organism is an obligatory aerobe, unable to grow in the absence of oxygen."

The American strain possesses an average degree of virulence, and animals immunised against the Japanese or Belgian strains are also resistant to the American. The author considers that the spirochaetes, designated in his paper as Japanese, Belgian and American, are probably identical.

ii. The second paper gives an exhaustive account of the spirochaetes. A bibliography is added to the article, and tables, giving the effects of various chemical and chemotherapeutic agents on the more important of these organisms, are incorporated in the text. This paper should be consulted by those who are interested in the recent work on this subject.

R. P. C.

Jobling (James W.) & Eggstein (A. A.). **The Wild Rats of the Southern States as Carriers of *Spirochaeta icterohemorrhagiae*.**—*Jl. Amer. Med. Assoc.* 1917. Nov. 24. Vol. 69. No. 21. p. 1787.

The authors observed a case of infectious jaundice at Nashville, Tennessee. They therefore examined a series of wild rats to ascertain whether they harboured *Spirochaeta icterohemorrhagiae*. One kidney was made into an emulsion in saline and injected into the peritoneal cavity of a guinea-pig ; the other was examined microscopically. Of 100 rats examined 10 per cent. harboured this organism. The pigs that developed the disease died after 12 or 14 days with jaundice and small haemorrhages in the subcutaneous tissue. Spirochaetes were found in the urine and kidneys. The authors show the importance of these observations in view of the number of Americans who are undergoing trench training.

A. G. B.

ARAGÃO (Henrique de Beaurepaire). **Sobre a presença do Espirochaeta icterohemorrhagiae nos ratos no Rio de Janeiro.** [On the Presence of *Spirochaeta icterohaemorrhagiae* in Rats in Rio de Janeiro.]—*Brazil Medico.* 1917. Sept 29. Vol. 31. No. 39 pp. 329–330.

The occurrence of spirochaetosis icterohaemorrhagica in human beings has been noted in Brazil by McDOWELL and BENTES, and the author accordingly determined to look for the presence of its spirochaete in rats. Six wild rats (*Mus norvegicus*) were caught and examined, the kidneys of each one being rubbed up with sterile salt solution with a little sand so as to form an emulsion Two cc. of the emulsion from each rat was then injected into the peritoneal cavity of a corresponding guinea-pig. Of the guinea-pigs so treated one died at the end of 10 days with typical symptoms, comprising jaundice, haemorrhagic foci in the lungs and stomach, epistaxis and oedema. Emulsions of the liver of this guinea-pig were then inoculated into six other guinea-pigs, all of which died with the same symptoms 8 to 10 days afterwards. In the organs of all these animals the typical spirochaete was found. The possibility of the occurrence of cases of spirochaetosis icterohaemorrhagica in man in Brazil is thus placed beyond a doubt.

J B. N.

GABBI. **Spirochetosi ittero-albuminurica e febbri ricorrenti.** [Icteroalbuminuric Spirochaetosis and Recurrent Fever.] *Malaria e Malat. d. Paesi Caldi.* 1917. Mar.-Apr. Vol. 8. No. 2. pp. 79–83.

A note drawing attention to the differences presented by the prevailing type of so-called ictero-haemorrhagic spirochaetosis on the Italian front, as compared with the disease described by WEIL and the Japanese observers. The disease, as seen on the Italian front, should be called *ictero-albuminuric* rather than *ictero-haemorrhagic*, and the nodosities on the spirochaetes described by HUEBENER and REITER are perhaps a point of difference not without importance In view of the number of troops on the different fronts imported from Asia (Mahometan Tartars among the Russians, troops from Tonkin among the French, and so on), it seems to Gabbi quite probable that this so-called spirochaetosis is one or other of the tropical types of recurrent fever, of which there are so many. He instances seven such, occurring in Russia, Arabia, Persia, India (Chitral, Darjeeling), Tonkin, Beluchistan and Indo-China.

J. B. N.

PUGLISI-ALLEGRA (Stefano). **Contributo alla conoscenza dell' ittero infettivo della zona di guerra.** [The Infective Jaundice of the War Zone.]—*Malaria e Malat. d. Paesi Caldi.* 1917. May-Aug. Vol. 8. No. 3–4. pp. 113–118.

The author, from a study of 191 patients suffering from infective jaundice, found that they could be divided into two groups, of which

162 cases were of a benign type and resembled the jaundice which follows gastro-duodenal catarrh, while the remaining 29 only were of a severe type, as described by ITO and INADA. In the latter category there were two fatal cases. Amongst civilians in the same hospital there were also 200 cases, similarly divisible into two classes, four-fifths being benign and one-fifth severe, among the latter being one fatal case. Positive results were only obtained with inoculation into guinea-pigs with the severe class. The infection among civilians seemed to begin with washerwomen who washed the clothes of the soldiers, and from them the disease was communicated to members of their families. The author thinks that the portal of entry was through the cracked hands of the washerwomen, enlargement of the epitrochlear glands at the elbow often being observed. In the case of members of their families it is surmised that the path of entry might be through the buccal mucous membrane, several instances of acute pharyngitis and labial herpes having been noticed in the early stages of the disease. For inoculation into guinea-pigs the urine of the patients was found to give better results than the blood. The stools are also certainly infective.

J. B. N.

MCCREA (H. Moreland). **Trench Fever. Is this Condition a Spirochaetosis? With a Note on the Technique of Wassermann Reaction** by W. E. Carnegie DICKSON.—*Lancet.* 1917. May 26. p. 796.

A number of observers have noted the presence of a spirochaete in cases of trench fever. RIEMER is doubtful as to whether it is the actual cause of the disease but the writer considers that it is not unlikely that an organism of this nature may ultimately prove to be so.

He states that a positive Wassermann reaction was obtained [in which "the index was not very high"] in the case of 63 patients suffering from the chronic type of this disease; although only four of this number gave a history of syphilis.

The treatment consisted of weekly injections of galyl, administered intravenously, for a period of ten weeks. Three days after each galyl injection, grey oil was given intramuscularly.

More than half the cases treated in this way returned to the Army. During treatment two of the severer cases developed posterior root pains—similar to those occurring in syphilitic conditions.

The writer states that "after a very few intravenous injections the Wassermann test reacted negatively."

R. P. C.

HUEBENER (E.). **Weilsche Krankheit, Rückfallfieber, biliöses Typhoid.** *Deut. Med. Woch.* 1917. Oct. 11. Vol. 43. No. 41. pp. 1289–1291.

In this paper, which contains no original observations, the so-called Weil's disease* or spirochaetosis icterohaemorrhagica is compared with relapsing fever, the points of assimilation and of difference being taken up in turn. There follows an account of bilious typhoid described by

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* WEIL himself believes that the cause of the disease described by him in 1886 has not yet been established (*Deut. Med. Woch.*, 1916, p. 130).

GRIESINGER in Cairo from observations made in 1850–52 and of a similar epidemic at Alexandria in 1888 recorded by KARTULIS. It is concluded that these were one and the same disease and that bilious typhoid is identical with Weil's disease.

[" Bilious typhoid " is described by SANDWITH in " The Medical Diseases of Egypt " under the heading Infectious Jaundice.]

A. G. B.

ITO (T.) & MATSUSAKI (H.). [*Spirochaeta icterohemorrhagiae*, an **Experimental Means of Infection.**]—*Saikingaku Zasshi.* (*Jl. Bacteriol.*). 1917. June 10. No. 261. p. 513.

[From Review by R. G. MILLS].

A guinea-pig whose heels had been cut in several places was placed in water heavily infected with these spirochaetes. This animal was in 48 hours afflicted with the disease whereas a control animal not so cut remained free from the disease.

A. G. B.

INADA. [**Serum Treatment of Infections by** *Spirochaeta icterohemorrhagiae.*]—*Tokyo Iji Shinshi.* (*Tokyo Med. News*). 1917. Apr. 28. No. 2021. pp. 24–25.

[From Review by R. G. MILLS].

The author summarizes the present knowledge as to the success of the serum treatment and makes a number of useful comments. Immune horse serum is used in 3 doses of 10 cc. each in the first 24 hours. There is very little preference for the intravenous method over the subcutaneous and in the severe cases there will probably be 35–40 per cent. mortality even with the best treatment. The temperature is not especially influenced by the injections and the icterus is only lessened when the injection is into the vein. The tendency to subcutaneous hemorrhage is lessened by this form of treatment but that beneath the mucous membranes is not affected. In fully half of he cases there is an irregular pulse and this condition is reduced to about 20 per cent. under treatment. Suppurative complications such as parotitis and impairment of vision are minimized. The reaction to the serum is slight, perhaps a little chilliness and occasionally a low fever.

A. G. B.

KANEKO (R.) & OKUDA (K.). [*Spirochaeta icterohemorrhagiae.* **Morphological Study during Serum Treatment.**]—*Chugai Iji.* (*Home & Foreign Med. News*). 1917. May 20. No. 8912. pp. 641–642.

[From Review by R. G. MILLS.]

During the study of cadavers of persons dead during the course of infectious jaundice it was determined that the spirochaetes are already dead in the liver, suprarenal capsules and other organs intimately related to the circulatory system. This was especially noticeable in the case of those who had died during the primary and secondary stages of the disease, at least suggesting that these would have died even without the use of the serum in treatment. The one exception to this finding was in the kidney in which organ they were still alive, indicating that the future development of the treatment should be toward the finding of means to eliminate them from this organ also.

A. G. B.

YAMANO (W.), SANO (B.) & ASHIGAWA (B.). [*Spirochaeta ictero-hemorrhagiae* **Occurrence in Wild Rats in Chiba, Japan.**]—*Saikingaku Zasshi.* (*Jl. Bacteriol.*). 1917. Mar. 15. No. 258. pp. 282–283.

[From Review by R. G. MILLS].

The proportion of infection of wild rats in Siba was 48 per cent. Three cases of the disease were found in this same area. Thirty-seven per cent. of the rats examined had evidences of pulmonary hemorrhage and the inference is that a connection exists between the bleeding and the attack of the spirochaetes. The distribution of the organisms in the wild rats was found to be the same as in those in captivity artificially infected.

A. G. B.

ARCE (Julian) & RIBEYRO (Ramon E.). **Sobre un caso de espiroquetosis ictero-hemorrágica.** — *Cronica Med.* Lima. 1917. Oct. Vol. 34. No. 652. pp. 355–360. With 1 plate & 1 text-fig.

The patient was a Japanese, aged 33 years, who had lived in Peru since the year 1909. The clinical features of the case were of the usual type, except that the Widal reaction was positive, which was attributed to a previous attack of enteric fever. The patient made a good recovery. Spirochaetes were obtained in pure culture from a number of cuis [? Cavia sp.] inoculated with the patient's urine.

J. B. N.

MISCELLANEOUS.

ACCRA. **Report of the Accra Laboratory for the Year 1916.** By J. W. Scott MACFIE [D.Sc., M.A., M.B., Ch.B., D.T.M., Pathologist, Gold Coast].—115 pp. With 1 map & 12 plates. 1917. London: J. & A. Churchill.

In this Report 29 pages are occupied by an account of routine examinations and 52 by papers on various subjects written by Dr. Macfie and Dr. A. INGRAM, which will be dealt with elsewhere. Under Blood Examinations it is noted that in 168, or 92·8 per cent. of the smears showing malaria parasites, these were *P. falciparum*, including *P. tenue* forms, as well as another atypical organism described by STEPHENS [see this *Bulletin*, Vol. 5, p. 351] In the examinations of faeces on account of dysenteric symptoms *E. histolytica* was found 41 times including 9 in specimens from Europeans; no systematic search for carriers has yet been made in West Africa. *Blastocystis enterocola* was met with 15 times and the significance of this body is discussed [*loc. cit.* Vol. 10, pp. 258–9]; Macfie thinks this organism may sometimes be pathogenic. *Trichomonas intestinalis* seems to be a common parasite at Accra. A species of *Nocardia* found in faeces is described with a plate. Its fermentation reactions could not be tested and the culture died en route to England, so that the species remains uncertain. Tubercle bacilli were found in the sputum of 11 natives and spirochaetes in 6 [it is not stated whether these were natives suspected of tuberculosis]. In smears from a woman suffering from vaginitis *Trichomonas vaginalis* was found and in another patient similar flagellates but having all four flagella free; both flagellates are figured. The discovery of *Spirochaeta icterohaemorrhagiae* as the cause of epidemic jaundice and the resemblance of that disease to yellow fever having revived the idea that yellow fever itself may be a spirochaetosis, tissues from six cases of yellow fever (liver and kidney) were examined by the Levaditi method; all the tissues had been preserved in formalin; in none were spirochaetes found.

In 64 post-mortems 11 deaths were attributed to amoebic dysentery and three to ankylostomiasis; in these *Necator americanus* was found. Porocephalus larvae were seen in two instances. Of the amoebic dysentery cases some had been about till the day before death and some had the bowel ulcerated from the caecum to the rectum. The author points the moral that a course of emetine injections in only the beginning of treatment. In one case the disease had spread into the appendix; it is noted that appendicitis has been found only twice in 187 autopsies at Accra. The author criticises the suggestion that "*Stegomyia fasciata* relies chiefly, if not solely, upon the egg stage for the survival of the species during the dry period" (BACOT), as applied to the conditions in a town like Accra; he suggests that the resistant egg-stage was an adaptation acquired at an earlier period, when Stegomyia bred in rat-holes in trees.

The report is beautifully illustrated.

A. G. B.

BOMBAY. **Report of the Bombay Bacteriological Laboratory for the Years 1915 & 1916.** By Major W. Glen LISTON [C.I.E., M.D., D.P.H., I.M.S., Director Bombay Bacteriological Laboratory].—9 pp. 1917. Bombay: Printed at the Government Central Press. [Price 2*a*. or 2*d*.]

As the Bombay Bacteriological Laboratory is the laboratory where all anti-plague vaccine or India is made and plague investigations are carried out, and also the General Laboratory for the Province of Bombay, the Report is divided into two parts. Part I is dealt with elsewhere. In Part II the usual account is given of the routine work. Dr. SOPARKAR notwithstanding efforts has not yet met with the bovine type of tubercle in human beings in India. Experimental work goes to show that Indian calves are less susceptible to infection than English Other activities are briefly described. The Laboratory has supplied vaccines, sera, etc., for military purposes, and in 1916 undertook the charge and organisation of the Pathological and Bacteriological work of the War Hospitals in Bombay. Owing to accumulation of convalescent typhoid and paratyphoid cases an Enteric Depot was opened at Parel. At the date of the Report 523 patients had been passed into it and 229 had been discharged, 6 of whom were para. A carriers, all faecal. The Report demonstrates the great activity of the Laboratory.

A. G. B.

COONOOR. **Pasteur Institute of Southern India, Coonoor. The Annual Report of the Director** [J. W. CORNWALL, Lieut.-Col. I.M.S.], **together with the Tenth Annual Report of the Central Committee of the Association.**—25 pp. 1917. Madras: Printed by the Superintendent, Government Press.

This Report deals with the period March 1916 to February 1917. The table that follows shows the results of treatment for 1916–17 and for 1907–1917.

TABLE I.

Period. (1)	Total number of patients treated. (2)	Died during treatment. (3)	Died less than 15 days after the completion of treatment. (4)	Died more than 15 days after the completion of treatment. (5)	Percentage of failures (omitting columns 3 and 4). (6)	Percentage of deaths, including column 4. (7)
1916-17	1,707	4	5	15	·87	1·16
1907-17	9,887	21	33	73	·73	1·07

An attempt was made in this year to get more satisfactory statistics by circularising the authority who sent the patient, three months after completion of treatment. Of the 1,634 replies (no less than 96 per cent.) 1,543 persons were in good health, 20 had died of hydrophobia, 60 were not traceable and 11 had died of other causes, "a rate that might be expected amongst a mixed population." It is shown by tables that the biting animal is proved rabid by laboratory tests in about 17 per cent. of the patients treated but was not certified as rabid in more than 2 per cent.; however in Asiatics laboratory proof of rabies in the biting animal is of little importance, for 74 per cent. of deaths among those treated occurred in cases where "Animal was probably rabid, judging by the history given"; 9 per cent. of deaths occurred in cases where "Animal bit and ran away; nothing further known"; hence treatment cannot be refused to such persons. An attempt is made to assess the value of the treatment by tabulating for four years the number of patients treated and untreated, as far as figures for the latter group can be ascertained, with the respective mortality from hydrophobia. It works out as 2·39 for the treated, and 5·54 for the untreated, but possible errors are indicated. As has been stated before in these reports, every mad dog is not always in a condition to infect by biting, but when a mad dog is in an infective condition it will infect perhaps 40 per cent. of persons it bites.

From the eleven tables it is seen that the patients treated during the year were 1,546 natives and 161 Europeans and Eurasians, how many days after the bite treatment was instituted and the result in each group of five days, classification according to part of body bitten, classification by provinces and by castes, the biting animal, etc. The Report of the Central Committee and Balance Sheet follow.

A. G. B.

NIJLAND (A. H.). **Jaarverslag van de Landskoepokinrichting en het Instituut Pasteur te Weltevreden over het jaar 1916.** [Report of the Vaccination-Bureau and the Pasteur Institute at Weltevreden for 1916.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 4. pp. 465–489.

In the year 1916 enough vaccine was sent out from the vaccine department at Weltevreden to vaccinate 8,730,000 persons. The number of persons successfully vaccinated in the whole of the Dutch Indies in 1916 was 1,100,000, the percentage of successful cases being 98·1. At the Pasteur Institute 788 persons applied for treatment for rabies, of whom 472 were submitted to treatment. Out of this number 10 died, but only 2 of the deaths occurred after treatment had been completed =0·41 per cent.

J. B. Nias.

CASTELLANI (Aldo). **Notes on Tropical Diseases met with in the Balcanic and Adriatic Zones.**—*Jl. Trop. Med. & Hyg.* 1917. July 16, Aug. 1 & 15, Sept. 1 & 15, Oct. 1. Vol. 20. Nos. 14, 15, 16, 17, 18 & 19. pp. 157–164; 170–174; 181–186; 198–202; 209–214; 219–223. With 2 plates, 15 charts & 4 figs.

The first part of this paper is concerned with malarial fever and has been noticed in the Section dealing with that disease. The diseases considered in the second and third sections are, typhus, relapsing fever, pappataci fever, dengue, enterica and enteric-like fevers due to other organisms.

Typhus.—The rash, course and sequelae, prophylaxis.—There is generally a very marked flushing of the face, neck, and upper part of chest, and a subcuticular mottling of the lower part of chest and the abdomen—this during the second and third day. The same appearances are almost constant in pappataci fever. The true typhus rash, which appears on the fourth or fifth day, is described. It may be indistinguishable from that of enteric or may be absent. A petechial rash is common in the Balkans, due to innumerable flea bites; this when associated with malarial fever may deceive the novice. The average duration of fever was 14–18 days; in 80 per cent. of the cases it comes down by lysis. Typhus and relapsing fever frequently co-exist, not unnaturally seeing that both are conveyed by the louse. As regards prophylaxis the conclusions of the author's paper with JACKSON are given [see this *Bulletin*, Vol. 7. p. 192]: most of the experiments there described were, it may be remembered, concerned with the louse apart from its host.

Relapsing fever.—Was often seen with or after typhus or with malaria. At the onset it cannot, without the microscope, be diagnosed from typhus, malaria, or pappataci fever. Cutis marmorata and flushing of the face have here again been seen very frequently, and "occasionally a very fine rash composed of very small, roundish, delicate pinkish or red roseola spots on chest, abdomen and trunk, even in cases in which a mixed infection with typhus or enteric could be excluded." The mortality in Castellani's cases was less than 3 per cent. A combined treatment with salvarsan and tartar emetic gave the best results, the latter intravenously.

Pappataci fever.—Very common in the Balkans and Adriatic zone. *P. papatasii* is extremely numerous and bites by day as well as by night. Here again subcuticular mottling is seen on chest and abdomen. The flushing of the face and neck lasts long after the fever is over, 8, 12 or even 15 days. "As regards the appearance of the fauces, not only is there the usual congestion of tonsils and pharynx common in most acute fevers, but the mucosa of the soft palate presents a peculiar appearance—small hyperaemic roundish spots"—the eruption ceasing abruptly at the hard palate; this appearance is not peculiar to pappataci fever. The diagnosis between this fever and incipient typhus is difficult but aid is given by the fact that in the former there is leucopenia, in the latter none.

Dengue.—Castellani was shown cases labelled dengue in Macedonia, but considered them all to be pappataci fever. The features of each disease are given. He finds that, contrary to the text books, the enlargement of some lymphatic glands is comparatively frequent in dengue and may be considered to be one of the common features of the disease. They may be tender on pressure and may remain enlarged for some weeks. Gland juice injected into healthy persons will reproduce the disease (two positive out of three). He has known several cases of relapse. As a seque a polyarthritis with swelling of joints is rare but very troublesome.

Enteric fevers.—The three well recognized types are common; two or even all three may occur together.

Enteric-like fevers.—These are classed under six headings according to the biochemical reactions of the respective organisms. A table of the Cultural Reactions of Certain Aerobic Non-Spore Producing Intestinal Bacilli gives 28 reactions—mostly with sugars—of no less than 70 micro-organisms, 33 of which have been described by the author.

Castellani has seen two cases of "*Malta*" *fever* in Macedonia, and one of *kala azar* in a child in Macedonia.

The fourth section is concerned with fevers of various origin, jaundice and several kinds of dysentery and diarrhoea.

Quartan fever of non-malarial origin.—This has been seen by Castellani in Ceylon and he has met with two cases in Europe. The temperature chart (an example is given) is typical of malarial quartan, but the spleen is not enlarged, no parasites can be found, and quinine is useless. In one instance the fever lasted four months.

Rat-bite fever and *trench fever* were met with, as well as *low intermittent* and *high intermittent non-malarial fever*; in the latter the only treatment of any use is change of air; the case of a Serbian boy is detailed.

Types of jaundice.—The most common was *camp jaundice* which was met with in its severe and in its mild form. Each is attributed to spirochaetes, and the author thinks that the mild type has nothing to do with paratyphoid [see this *Bulletin*, Vol. 8, p. 73]. The pre-jaundice period in this form may be very long and is occupied by aches and pains with a normal or slightly raised temperature. Other forms of jaundice are of malarial origin; of paratyphoid origin; the icteric type of relapsing fever, the "bilious typhus" of old authors, which is generally very severe: and splenomegalic jaundice seen in young people in Serbia between 18 and 24.

Beriberi (two cases), *pellagra* and *blackwater fever* (one case) were met with.

Dysenteries.—*Bacterial dysentery* is very common in the Balkan Zone, the amoebic form less so. Shiga-Kruse, Flexner, Hiss and intermediate types were seen. Castellani calls attention to the choleraic type, which has caused much difficulty in diagnosis; in Ceylon it is called "serous diarrhoea." He lays stress on starting the treatment of bacterial dysentery with a purgative, castor oil or sulphate of magnesia. Two sequelae often noted were parotitis and polyarthritis He gives directions how to obtain a dysentery vaccine with no severe local and general action. As to *amoebic dysentery* he considers emetine a very safe drug but one which does not always achieve complete sterilisation.

Flagellate diarrhoea is far from being rare in the Balkans and Adriatic Zone. The flagellates found are *Lamblia intestinalis*, *Trichomonas hominis*, *Cercomonas hominis*, *Tetramitus mesnili*, less commonly a *Prowazekia* near to *asiatica* Castellani & Chalmers. Flagellates were found in the stools of 15 per cent. of healthy persons in the Balkans. Castellani thinks that when present in large numbers they cause diarrhoea, Lamblia being more pathogenic than the others. He gives methylene blue, 1–3 grains. by the mouth and also by intestinal irrigation; the drug "had no action on Lamblia infections." *Balantidial diarrhoea* was seen and *coccidiosis* is comparatively common.

Of *cholera* there was very little; in a case of supposed cholera *V. paracholerae*, identical with a Ceylon strain, was found. Choleraic diarrhoea was caused by (1) food poisoning (*B. aertryke*), (2) bacteria of the dysentery group and (3) malaria. A typical case of *sprue* was seen in a woman at Skoplje.

The fifth instalment treats of helminth infections, broncho-spirochaetosis and broncho-mycosis [see this *Bulletin*, Vol. 10, p. 306] and diseases of the uro-genital organs.

Ancylostoma duodenale was seen in two boys at Skoplje, but not in soldiers. A case of anguillulosis due to *Strongyloides stercoralis* was seen. Taenia seemed to be "rather frequent." At Skoplje in a case of acute lymphadenitis with great enlargement of the left leg the night blood was found to contain embryos of *Filaria bancrofti*, and a typical case of *endemic funiculitis* diagnosed as strangulated hernia was seen in Macedonia.

In addition to broncho-spirochaetosis the author describes "*rhino-pharyngitis spirochaetica*" in which the symptoms are those of severe coryza. Some cases are due to *S. bronchialis*, others to a spirochaete of different morphology.

Six varieties of non-gonorrhoeal urethritis are described, some of which however appear to have been met with in the Tropics and not in the Balkans or Adriatic Zone. These are, (1) traumatic mucous urethritis, (2) urethritis of hyphomycetic origin, (3) flagellate urethritis (Trichomonas, Cercomonas, Prowazekia), (4) amoebic urethritis, (5) spirochaetic urethritis, and (6) treponema urethritis.

The last instalment is concerned with skin diseases.

A. G .B.

MENDOZA-GUAZON (Maria Paz). **Study of the Anatomicopathologic Lesions in One Thousand Filipino Children under Five Years of Age.**—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. Mar. Vol. 12. No. 2. pp. 51–84.

It is not possible in the space at disposal to give an adequate account of this interesting and fully documented paper. The following is extracted from the author's summary :—

"(1) Hemorrhage is the most frequent cause of death during the first few days of life and the brain and meninges are the favorite seats. Congenital anomalies are also responsible in many instances.

"(2) Of the children in this series 15·9 per cent. are infected with nematodes, and the frequency of infestation increases as age advances. The first variety that invades the alimentary tract of children and the one that infects the most is *Ascaris lumbricoides*. 95·5 per cent. This worm shows also a great migratory activity, which is probably favoured by an abnormal condition of the intestines.

"(3) The most frequent concomitant lesion of gastrointestinal disease is bronchopneumonia In 193 cases the morbid condition was located in the colon in 68 and in both intestines in 54 cases. Amoebic dysentery is very rare in children, there being only one recorded case, and yet the lesions as described are not typical.

"(4) Asiatic cholera was nil during April and May [hot months], the incidence increasing with age and during epidemics. Newly born infants can be infected during their existence from a mother suffering with the disease.

"(5) In infants it is almost the rule for tuberculosis to become generalized rather than localized, the lungs being the commonest seat of lesion and the aèrogenic type the most frequent mode of infection. The pericardium, oesophagus, duodenum, rectum, gall bladder, and reproductive system were not affected in this series even in a generalized acute and diffuse infection. Tuberculosis in this series has been found in 80 cases.

"(6) Infantile beriberi has been anatomically diagnosed in 150 cases. The literature shows that the disease is met only in infants born of, or nursed by, women on an exclusive rice diet. It is not seen in Manila in the children of foreigners that do not eat much rice. . . .

"This series shows that infantile beriberi is less prevalent during April, May, June, and July and that the age most affected is between 1 and 3 months. . . .

"(7) Pneumonia, lobar and lobular, has been met with in 21·6 per cent. of this series. If in this we include other diseases of the respiratory tract, we shall probably see that this tract is the most vulnerable place in young children.

"(8) Suppurative meningitis has been met with more frequently in the records than tuberculous meningitis and more so during the first two years of life.

"(9) Typhoid, malaria, and tumours are rare in children of this series.

"(10) The pathological study of this series includes only the causes of stillbirths, of death below the first six days of life, diseases of the gastro-intestinal tract, tuberculosis, pneumonias, meningitis, typhoid, malaria, and tumors."

The majority of the cases came from the Philippine General Hospital; they occupied a period of a little over five years. The causes are discussed of cases of still birth (52), and of death during the first six days of life (46 cases). 207 cases, excluding tuberculosis and cholera, showed anatomically some lesion in the alimentary tract. In many of these the diagnosis was "malnutrition." Cholera formed 103 cases, or 10·3 per cent, and it is believed the percentage would have been higher if cases diagnosed as cholera infantum and acute catarrhal enteritis had been bacteriologically examined; 18 patients were under 12 months old. "The clinical picture of cholera in children is often atypical" (McLaughlin). Attention is drawn to the "great frequency of the association of the disease with *Ascaris lumbricoides* and their migratory activity." Of 159 cases of infection with the four common nematode intestinal parasites Ascaris formed the great majority; there was only 1 case of cestode infection, with *Dipylidium caninum*. A table of "Age distribution of infection by worms" shows that Ascaris invades the alimentary tract at 3–4 months. In only 4 cases was Ancylostoma found and 4 Oxyuris, at 1½, 2 and 2–3 years respectively. Infantile beriberi has been for many years at the head of the list of causes of infantile mortality in Manila. Of 150 cases recognised at autopsy 65 were diagnosed clinically; of the rest 25 were diagnosed convulsion and 25 acute bronchitis. The author discusses at some length the hypertrophy and dilatation of the right ventricle which, with other signs, was present in 132 cases. Disease of the respiratory tract came second in the causes of infantile mortality. Broncho-pneumonia, excluding tuberculosis, accounted for 180 cases or 18 per cent.; lobar pneumonia for 36 cases only. Typhoid was met with in only 3 cases, malaria in 6. [For a similar study of a much smaller series in Panama see this *Bulletin*, Vol. 9, p. 256.]

A. G. B.

Kermorgant. Fonctionnement des postes médicaux des consulats français de Chine et du Siam.—*Bull. Acad. de Méd.* 1917. Oct. 23. 3 Ser. Vol. 78. Year 81. No. 41. pp. 459–466.

Dispensaries and hospitals have existed for many years in association with French Consulates in China and Siam, at Yunnan Fou and

Montgtse in Yunnan Province, at Pakhoi in the Gulf of Tonkin, at Hoihao and Kiungchow on the Island of Hainan, at Canton and in Siam. An account is here given of the character of the posts and of the numbers of patients attended. Medical schools are attached to some of them. Yunnan (1,900 metres) is destined to be a sanatorium for the French in Indo-China.

A. G. B.

BUTLER (C. S.) & HAKANSSON (E. G.). **Some First Impressions of the Virgin Islands, Medical, Surgical, and Epidemiological.**—*U. S. Nav. Med. Bull.* 1917. Oct. Vol. 11. No. 4. pp. 465–475. With a map, 3 charts & 4 plates.

This attractively illustrated article gives an account of the islands which have been recently taken over by the United States from the Danes. They belong to the Leeward Islands group and extend from Porto Rico east and south. S. Thomas, S. John and S. Croix were transferred; the last named has an area of 84 square miles and a population of 14,000, chiefly negroes. S. John has most of the malaria —malignant tertian and quartan; the anopheline has not been identified. Hookworm infection is found in S. Croix but is not widespread. A conservative estimate of the extent of filariasis is 25 per cent. Pellagra is "quite common." Owing to lack of sanitation throughout the islands disease incidence and death rates are high. These are attributed to:—

"(a) Lax observance of the laws relating to marriage. To this is attributable the high rate of illegitimacy and of venereal disease and indirectly the high infant mortality. (b) Poor food conditions leading to undernourishment and pellagra. (c) Poor sewage disposal and defective water supplies, leading to numerous intestinal disorders: diarrhea, dysentery, and typhoid. (d) Long-continued encouragement to house breeding of mosquitoes, which has caused the high rate of filarial infection and high morbidity from this cause."

There is no laboratory in the group and the doctors are much overworked, but it appears that the islands should be healthy and prosperous. They have been managed from Denmark and insufficient funds have been available for sanitation.

A. G. B.

ESPINOSA-TAMAYO (L.). **Ueber die pathologische Geographie von Ekuador.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Sept. Vol. 21. No. 17. pp. 285–291.

An abstract of a thesis. Among arthropods and ticks which are of frequent occurrence on the Coast are mentioned *Stegomyia fasciata, Cellia albimana* and *Sarcopsylla penetrans*; *Xenopsylla cheopis* and *Pulex dugesi* (from rats); *Ctenocephalus serraticeps* (from dogs); *Cimex rotundatus*; *Amblyomma cajennense, A. maculatum, Dermacentor nitens* (determination by NUTTALL).

Figures are given of the relative frequency of various helminths. Ova of *Ancylostoma duodenale* and *Necator americanus* were found in 179 cases out of 279 (64·1 per cent.); *Oxyuris vermicularis* was absent. Of flat worms *Taenia solium* and *Hymenolepis nana* are mentioned.

It is stated that malaria and amoebic dysentery are widespread on the coast; no figures of malarial parasites are given and the entamoeba was found only twice in the 279 cases. Yellow fever occurs chiefly in the State of Guayaquil; it has now " almost completely disappeared." Of bacterial diseases tuberculosis is the most lethal. Enteric fever is widespread and specially in Guayaquil and Quito. Many other diseases are mentioned but no figures are given to enable one to gauge their incidence. A disease called " chichismo " is caused by a drink named " chicha " produced by the fermentation of maize. It is said to resemble pellagra.

A. G. B.

MEDICAL MISSIONS IN INDIA. 1917. Oct. Vol. 23. No. 91. pp. 112-115.—**Symposium: Indigenous Drugs.**

DR. J. M. MACPHAIL considers the unripe bael fruit [*Aegle marmelos*, N. O. Rutaceae] of real value in dysentery. The powdered seed of *Butea frondosa* [N. O Leguminosae] is a substitute for santonin, which has gone up to a " fabulous price." " Plantain leaves may be utilised as a dressing for blistered surfaces, as a substitute for gutta-percha tissue in covering water-dressings, and as eye-shades." [Uganda missionaries could amplify this list.]

Dr. Caleb DAVIES finds *koorchi*, the bark of *Holarrhena antidysenterica* " of considerable value in chronic dysentery and diarrhoea." He uses locally prepared linseed oil in place of cod-liver oil and is very pleased with the results.

A. G. B.

GABBI (Umberto). **La sindrome delle malattie febbrili da virus filtrabile od ultramicroscopico (criptomorfo?) e gli insegnamenti della Clinica.** [The Symptoms of the Fevers due to Filterable Viruses and their Classification for Clinical Purposes.]—*Malaria e Malat. d. Paesi Caldi.* 1917. Sept.-Dec. Vol. 8. No. 5–6. pp. 190–199. With 6 figs.

The author thinks that the term " cryptomorphic " is more suitable than filterable or ultra-microscopic for this class of pathogenic agents. Their principal points of distinction from a clinical point of view are summed up as follows, (1) limited febrile period, (2) termination by crisis, (3) double-peaked curve in some instances, (4) absence of splenic enlargement, (5) virus only communicable in the early stage of the disease, (6) relapses exceptional, (7) anatomical lesions not distinctive.

J. B. N.

SMITS (J. C. J. C.). **v. Syphilis en Gonorrhoe eener Javaansche koeliebevolking.** [Syphilis and Gonorrhoea in a Javanese Coolie Population.]—*Geneesk. Tijdschr. v. Nederl-Indië.* 1917. Vol. 57. Nos. 3 & 4. pp. 377–417; 431–447. With 4 charts.

Statistics as to the prevalence of venereal diseases amongst the coolie population (male and female) of the Sennah Rubber Company at Bila (Sumatra). All coolies are quarantined on arrival, and examined generally for disease. In 1914, 269 men and 57 women gave the following figures for the presence of venereal disease :—

	Gonorrhoea.	Syphilis.
Men	31	3
Women	33	15

while, in 1915, for 253 men and 132 women the figures were :—

	Gonorrhoea.	Syphilis.
Men	24	1
Women	50	16

Most of the women are in fact professional prostitutes.

Since 1912 the author has followed the practice of detaining all cases of venereal disease in hospital until thoroughly cured, with the result of greatly reducing the amount of these diseases. The results are shown in tabular form at the end of the paper. Of 221 children born in hospital between November 1913 and December 1915, no less than 23, or 10·4 per cent., were still born.

J. B. N.

Gabbi (Umberto). **Sulla porpora reumatica scorbutiforme nelle truppe e negli operai militarizzate alla fronte.** [A Scorbutiform Type of Rheumatic Purpura occurring among the Troops and Labourers in Military Employment on the Italian Front.]—*Malaria e Malat d. Paesi Caldi.* 1917. May-Aug. Vol. 8. No. 3-4. pp. 124-152. With 1 coloured plate & 12 figs.

Notes of 19 cases of a form of purpuric eruption on the legs, and sometimes also on the arms, accompanied by fever, swelling of the gums, enlargement of the spleen and gastric disturbances, which broke out somewhat suddenly amongst soldiers and civilians employed on military work on a portion of the Italian front. A similar outbreak had been recorded among the Austrian prisoners on the island of Asinari, and had been termed, by the Austrian surgeons in charge of them, scurvy. As this diagnosis seemed to reflect on the quality of the food supplied to the prisoners by the Italian Government, all of which was of the best quality, Professor Gabbi thinks it of importance to describe this scorbutiform malady more particularly. None of the Italian soldiers and civilians attacked had been fed to any extent on tinned food, and very few of the patients were in a bad state of general health. The cases all came from trenches in a high and cold mountain district, the men having to remain in the trenches without exercise for four days or more at a time. They slept in dugouts or in galleries cut in the rocks. The air temperature was low, especially at night. The cases all improved rapidly in hospital without any special treatment, the duration of their stay ranging from a few days to two months. In a few cases in which the blood was examined, the haemoglobin ranged from 50 to 70 per cent. of the normal, and the number of red cells per cubic millimetre from 2½ to 3 millions, the leucocyte counts being always normal. The author is therefore inclined to regard the condition as a form of rheumatic purpura, and not as true scurvy. The character of the eruption is illustrated by a good coloured plate.

J. B. N.

GIUGNI (Francesco). **La porpora emorragica scorbutiforme ad andamento epidemico in alcuni reparti di truppe combattenti.** [Epidemic Scorbutiform Haemorrhagic Purpura among Italian Troops.]—*Malaria e Malat. d. Paesi Caldi.* 1917. Sept.-Dec. Vol. 8. No. 5-6. pp. 161–177.

An account of a subfebrile form of purpura haemorrhagica with scorbutiform affection of the gums, prevailing among Italian troops serving at high altitudes in the Dolomite Alps. SICCARDI and GABBI have reported similar cases. In many instances the symptoms persisted notwithstanding the addition of vegetables and milk to the diet. The cases cropped up at intervals between June and December 1916 and then ceased. Blood cultures were always negative. Two guinea pigs were inoculated with blood from one case, with a negative result. The disease was never fatal, all the cases improving at once on removal to hospital. The duration of symptoms ranged from a fortnight to two or three months.

J. B. N.

IWANO (S.). **Ueber die chemische Natur des Scorpiongiftes.** [Japanese text.]—*Kyoto Igaku Zassi.* 1917. May. Vol. 14. No. 4. [Author's summary in German, p. 40.]

The author says that the chemical nature of the poison of scorpions is quite unknown. His experiments were made with scorpions from Manchuria the species of which are not stated. The results are thus summarised:—(1) The poison is a protein. (2) Two kinds can be distinguished, one soluble in water, the other in dilute acids and salt solution. (3) Two kinds of small crystals can be obtained and if, the poison is decomposed by trypsin, others like those of leucin and tyrosin. (4) The poison is destroyed by pepsin and trypsin and by potassium permanganate and calcium hypochlorite. (5) Lecithin and cholesterin in considerable quantity are also present in the scorpion poison.

A. G. B.

MACFIE (J. W. Scott). **A Note on the Occurrence of Leukaemia in the Natives of West Africa.**—*Report of the Accra Laboratory for the Year 1916.* 1917. London: J. & A. Churchill. pp. 39–42. With 1 chart.

The author has met with three cases of leukaemia on the West Coast since 1910, and considers that it is uncommon. One was of the myelogenous type, the other two lymphatic; two proved rapidly fatal. One only was seen more than once and a chart is given showing the variations in the numbers of blood corpuscles over a period of 4½ months. A severe attack of malaria was followed by a reduction in the number of white as well as of red corpuscles, the white being reduced to less than a quarter of what they were before; the differential count, however, was only slightly changed. In this case 97–98 per cent. of the cells were lymphocytes.

A. G. B.

HESS (Alfred F.) & UNGER (Lester J.). **Prophylactic Therapy for Rickets in a Negro Community.**—*Jl. Amer. Med. Assoc.* 1917. Nov. 10. Vol. 69. No. 19. pp. 1583–1585.

Over 90 per cent. of the coloured babies in the neighbourhood of New York have rickets. In the district selected for the trial, in 1915 the infantile mortality was 314 per mille. Cod liver oil was given to about 50 babies between 4 months and 1 year. A table shows that when 54 ounces of oil was given over a period of 6 months 2 of 32 infants developed rickets, with smaller quantities (17 children) a larger proportion developed rickets and without oil, of 16 no less than 15. Whether the infants were breast or bottle fed made no marked difference. A four months' course appears to be insufficient. Details are furnished in six tables. The author says that olive oil cannot be substituted for cod liver oil. An animal oil is necessary, "probably from some glandular organ." No details are given of the food of the children or their mothers.

A. G. B.

DE LANGEN (C. D.) & SCHUT (H.). **Verdere waarnemingen omtrent het reduceerend vermogen van het bloed in de tropen.** [Further Observations on the Reducing Power of the Blood in the Tropics.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 2. pp. 260–276. With 9 charts.

In the present paper the authors continue their observations on the increased sugar-content of the blood in inhabitants of the tropics, as estimated by Bang's method [see this *Bulletin*, Vol. 9. p. 259]. They find that individuals living in a hill-station (Sindanglaja, 3,600 feet above sea-level) show figures intermediate between those found by them in individuals residing in Europe and in Batavia respectively, and conclude that this fact shows that the increased sugar-content of the blood is not due to the excessive carbo-hydrates of a tropical diet, as has been suggested by other researchers, but is a result of high external temperature solely.

The following table gives the average percentages found :—

	Holland.	Sindanglaja.	Batavia.
Rabbits	0·10	0·135	0·16
Guinea-pigs	0·115	0·13	0·145
Hens	0·15	0·185	0·255
Ricebirds	—	0·17	0·275
Europeans	0·09	0·13	0·165
Javanese	—	0·13	0·155

J. B. N.

DE LANGEN (C. D.) & SCHUT (H.). **Over Glycosurie in de tropen en Low fever.** [On Glycosuria in the Tropics and Low Fever.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 3. pp. 330–341.

A paper discussing a form of glycosuria met with in the tropics, which the author denominates "*Diabetes innocens.*" The percentage of sugar in the urine is low, not exceeding 1 per cent., and the quantity of urine not being greatly increased, the total amount of sugar passed in the 24 hours does not exceed 10–12 grammes. It is uninfluenced by dieting. The sugar content of the blood is lower than normal. Patients may seem quite well and show none of the normal symptoms of diabetes, the condition being often discovered by accident. It is suggested that the permeability of the renal epithelium is greater in tropical countries than in temperate ones, and that the condition known as "Low fever," characterized by a raised temperature and general malaise, is often ascribable to this form of glycosuria. Removal to a temperate climate, or to a hill station, will often arrest the symptom. Nine cases, some occuring in Europeans and others in natives, are quoted in illustration.

J. B. N.

PEACOCK (W. L.). **Note on the Value of Salvarsan in Relapsing Fever and Malaria.**—*Jl. Trop. Med. & Hyg.* 1917. Nov. 15. Vol. 20. No. 22. pp. 254–255.

The author at Mwanza on the Victoria Nyanza treated 12 cases of relapsing fever in Indians with salvarsan intravenously in single doses of 0·1 to 0·5 gm. In every case the parasites were found 6–15 days later and the reaction appears to have been severe. In two cases of syphilis subtertian parasites appeared in the blood 1–2 days after a salvarsan injection. [Salvarsan per se is known to have little or no effect on subtertian malaria.]

A. G B.

MAYER (Martin). **Zur Symbiose von Spirochäten und fusiformen Bazillen bei geschwürigen Prozessen.** [The Symbiosis of Spirochaetes and Fusiform Bacilli in Suppurative Conditions.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. Oct. Vol. 20. No. 19. pp. 442–444.

The author refers to observations made by KEYSSELITZ and himself in 1908 from which it was concluded that the spirochaetes go in advance of the lesions caused by the fusiform bacilli and penetrate far into healthy tissue. The same disposition was found in ulcers of the gut of cats. These animals were infected with a mild strain of dysenteric amoebae. In the ulcers were frequently found few amoebae but masses of spirochaetes and fusiform bacilli, which were considered to be secondary invaders. In one instance the fusiform bacilli were found chiefly in necrotic crypts in thick layers close to the submucosa, whereas the spirochaetes had penetrated this and occupied the septa between the inner layer of muscle, as well as between the fibres.

A. G. B

GANGULI (Satkari). **Infantile Biliary Cirrhosis.**—*Indian Med. Gaz.* 1917. Oct. Vol. 52. No. 10. pp. 361–363.

This disease, known as "infantile liver," is common in Bengal. It is "characterised by the permanent enlargement of the liver and spleen, persistent jaundice and abscence of ascites." Later in the paper ascites is given as a late symptom. It is also known as "Hanots' hypertrophic cirrhosis of the liver." It affects villages and towns in all parts of India. The cause is unknown. It commences during dentition up to the age of two. Its pathological anatomy has been described by Lieut. Col. GIBBONS, I.M.S. [reference not given]. The onset is insidious or with dyspepsia. Later, fever is almost constant. The mortality ranges between 60 and 80 per cent. Considerable space is devoted to treatment, dietary and medicinal. The medicine recommended, somewhat apologetically, is calf urine, two drams to one ounce taken internally and used as a fomentation. "When it is bottled up and well labelled with a charming 'nomenclature' I doubt if any customer would object to its use."

[This is perhaps the disease briefly described on page 1,403 of the 2nd Edition of CASTELLANI & CHALMERS'S "Manual."]

A. G. B.

GROTHUSEN. **Akute Entzündung des äusseren Gehörgangs in Ostafrika.** [Acute Inflammation of the Outer Ear Passage in East Africa.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. Feb. Vol. 20. No. 3. pp 56–57.

In the course of two years at Kilwa, the author saw many cases of acute inflammation of the external ear passage in man; during many years in the interior he saw no such cases. The affection occurs chiefly in the rainy, which is the hot, season. The ear becomes painful, the skin, especially of the external auditory canal, much swollen; the canal is narrowed so that the drum is often not visible; there is no secretion; pressure on the tragus towards the canal is very painful. The corresponding lymphatic gland is swollen and painful. Later there is pruritus. No furuncle forms. The condition lasts 10–14 days.

A. G. B.

SULDEY (E. W.). **Epidémie de méningite cérébro-spinale à méningocoques (?) à Madagascar.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 689–692.

Epidemic cerebro-spinal meningitis has not hitherto been reported from Madagascar. The disease appeared suddenly in July, 1916, in Creoles who had returned from France, there being four cases, three of which were fatal. In the purulent cerebro-spinal fluid an intracellular diplococcus was found, not staining with Gram and having the morphological characters of Weichselbaum's micrococcus. It could not, for want of facilities, be isolated nor tested with agglutinating serum. The 500 men concerned were isolated at Cape Diego and were regarded as all infected. For six days all were subjected three times a day to disinfection of the nasal fossa, mouth cavity, naso-pharynx, and pharynx by gargling, inhalation, and painting of the mucous membrane; details are given. A fortnight later all the men were fit and smears from 12 who had slight pharyngitis showed no organisms of meningococcic type. The 500 men furnished a contingent of 300 which was embarked for Marseilles. In spite of bad conditions on the voyage and the change of climate no case of meningitis nor symptoms suggestive of it appeared. Since then the disease has broken out among the Malagasies.

A. G. B.

STOCKMAN (Ralph). i. **Lathyrism.**—*Edinburgh Med. Jl.* 1917. Nov. New Ser. Vol. 19. No. 5. pp. 277–296. With 1 plate.
ii. **Lathyrism in Man.**—*Ibid.* pp. 297–307. With 2 plates.

These two articles do not appear to add much to knowledge, but as they give a much fuller account of the subject than is to be found in text books,* and hardly accessible reports are extracted in the second paper, they form a valuable compendium of the disease. It has been known since the days of HIPPOCRATES and was prevalent, especially in times of famine, in Northern India when the natives lived on an exclusive diet of certain species of Lathyrus or vetch. The effect of such feeding in various species of animals is described and the protocols of 11 experiments on monkeys are given, with others on rabbits, pigeons, ducks, a pig and a sheep, performed by the author. No histological changes could be detected in the muscles or nervous system of poisoned monkeys. An attempt was made to extract the poisonous principle, which is an alkaloid. The author says that "the whole subject requires to be thoroughly reinvestigated." A list of 39 references is appended.

A. G. B.

CHALMERS (Albert J.) & ARCHIBALD (R. G.). **Generalized Vaccinia in Sudan Natives.**—*Jl. Trop. Med. & Hyg.* 1917. Oct. 15. Vol. 20. No. 20. pp. 236–237. With 1 plate.

In the course of some 50,000 vaccinations of natives with calf lymph several cases of generalised vaccinia occurred. Two such are figured. In the first, a child of 5, the eruption appeared 12 days after vaccination and lasted 9 days, the only symptom being slight itching. The rash was vesicular and not umbilicated and was seen chiefly on the back. The second case was an elderly man. The rash appeared 22 days after vaccination, and required some 6 days to reach its height, the scabs being thrown off 8 days later. This patient had fever. The papules, which were more profuse and occupied a larger area, became vesicles and then umbilicated pustules; the scabs, the authors think, will leave depressed scars. No serious symptoms were heard of in any case. Personal idiosyncracy is considered to be the cause. Reference is made to a good paper on this subject by HILL & ROSS (*Jl. Hygiene*, 1910, Vol. 10, p. 137).

A. G. B.

DE RUYTER (J.). **Presbyopie bij Inlanders.** [Presbyopia in Natives (of the Dutch East Indies).]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 1. pp. 43–47.

From an examination of the eyes of natives the author comes to the conclusion that presbyopia progresses more rapidly in them, after the age of 40 years, than in Europeans. According to LANDOLT, presbyopia in Europeans may be reckoned as advancing from 0·25 D. at 40 years of age to 1·3 D. at 48. The examination of the eyes of 17 otherwise healthy natives, however, showed an average of nearly double this figure, namely, from 0·5 to 2·0 D., within the limit of 40 and 48 years. The author thinks the point worthy of further investigation.

J. B. N.

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* CASTELLANI & CHALMERS give a good account, exceeding two pages of their text-book.

VOGT (Volrath). **A Case of Arisaema Poisoning.**—*China Med. Jl.* 1917. Sept Vol. 31. No. 5. pp. 392–396. With 1 text-fig.

A Chinese woman ate of the tuber of a species of Arisaema which is figured. She was immediately brought to hospital where the stomach was washed out, after which she went home. A few hours later she became stuporous with distended abdomen and paresis of limbs, but the next day had recovered. The plant is said to have been identified by a Professor of Pharmacology as belonging to "the family of Arisaema." Its inflorescence resembles that of *Arum maculatum*, the lords and ladies of English hedgerows, to which genus it is allied. It is noted that only a small piece was swallowed and that treatment followed in 10 minutes: hence it must be considered very poisonous.

A. G. B.

WRIGHT (Louis T.). **The Schick Test, with Especial Reference to the Negro.**—*Jl. Infect. Dis.* 1917. Sept. Vol. 21. No. 3. pp. 265–268.

The Schick test, described in 1913, is defined as "a simple intracutaneous test that indicates whether or not the person tested possesses a natural antitoxic immunity to diphtheria." The practical value of the test has been generally established. The reaction is characterised by "a circumscribed area of redness and slight infiltration which measures from 1·0–2·5 cm. in diameter. It persists for 7 to 10 days and on fading shows superficial scaling and a persistent brown pigmentation." Scaling and pigmentation are characteristic of all positive reactions. The author, who was enabled to study the reaction in 207 coloured persons, sought to discover what colour the pigmentation would take on very dark or black skins, and the degree of natural immunity in negroes. Of 210 persons tested 86, or 40·9 per cent., reacted positively. On the dark skin the scales were white or grayish in colour, and the darker the skin the darker the pigmentation. It is concluded that the reaction is as clear cut in negroes as in whites and that adult negroes possess about the same degree of immunity as adult whites.

A. G. B.

DE GRANADA (S. H.). **Bijdrage tot de aetiologie der pneumonie.** [A Contribution to the Study of Pneumonia.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 7. pp. 1000–1012. With 2 diagrams.

Statistics of the incidence of croupous pneumonia amongst the workers in a coal mine, where it caused by far the largest item in the annual mortality. Part of the labourers were paid, while the remainder were convicts. The lodging provided varied with the class, and the incidence of pneumonia varied in the same proportion. Of the paid labourers the married ones lived in houses, and the remainder in sheds. The incidence of pneumonia was as follows:—

	Cases.	Number.	Percentage.
Married people	4 ..	263 ..	1·5
Unmarried paid workers	37 ..	1,278 ..	3·1
Convicts..	196 ..	2,657 ..	7·4

Elevations are given of the different classes of building provided.

J. B. N.

BAUJEAN (R.). **Notes sur quelques manifestations de la Pneumococcie chez les Tirailleurs des Camps de Fréjus et Saint-Raphaël.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 816–827.

Pneumococcus infection, and then tuberculosis, is the chief cause of admission to hospital and death at these camps in the South of France, and chiefly among the Senegalese, Malagasies and Somalis. The usual manifestations are pneumonia, broncho-pneumonia, pulmonary congestion and bronchitis, with the frequent implication of the pleura and pericardium but never the peritoneum. Other forms are here described.

Pneumococcus infection of the skin—six cases. In four the face was affected and the lesions suggested erysipelas; in the other two there was a generalised eruption. Extreme swelling of the face was followed by the eruption, in crops, of small bullae; the enclosed fluid swarmed with pneumococci. After a few days they dried up and crusts separated; small abscesses sometimes followed. There was continued fever, 39°–40° C., headache and delirium. In one case the phlyctenules covered the whole body, resulting in an acute pneumococcic pemphigus which ended fatally. Pure cultures were obtained from the phylyctenules. Details of the six cases are given, one in a Frenchman. The author has seen also a pneumococcic panophthalmia.

Pneumococcus infection of the meninges.—Of 52 cases of acute cerebro-spinal meningitis seen at these camps 30 were due to the meningococcus or varieties thereof, and 22 to the pneumococcus. The cerebro-spinal fluid showed polynucleosis and pneumococci. Pus was often found in the frontal and maxillary sinuses. In six cases the pneumococcus was found in the blood on the day of admission. The development of the disease was always rapid and the issue always fatal. Four cases are described; they show that in the cerebro-spinal fluid there is no correlation between cellular reaction and the number of microbes.

Pneumococcus septicaemia.—In 14 pneumonics taken as they came haemoculture at the onset showed pneumococci in the blood in five. Ten pneumonics without septicaemia recovered; of five with, four died. Two cases in which the septicaemia was primary are given.

A. G. B.

JOUIN (A.). **De la gravité de la Pneumonie chez les Noirs, les Malgaches et de la fréquence de la mort subite au cours de cette affection par dilatation cardiaque aiguë consécutive à une paralysie des centres nerveux du cœur.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 774–777.

The author is a medical officer of native workmen (*ouvriers coloniaux*) at Toulon. He has noted the severity of pneumonia among the blacks, especially the Malagasies, and the frequency of sudden death on the second or third day. The lesions in the lung were then at an early stage; most of the lung parenchyma floated in water; there were however always lesions of the pericardium, adhesion or serofibrinous effusion, and degeneration of the heart muscle. The liver and kidneys appeared normal. The author thinks death is attributable to the action of the pneumococcic toxins on the heart, causing neuritis and paralysis of muscle. He uses cardiac tonics from the beginning and, in particular, hypodermic injection of sterilised camphorated oil 10–12 cc. daily, with the addition of spartein, and the results have been excellent. He notes that arterial hypotension is the rule, and that endocarditis is rare.

A. G. B.

MOSES (Arthur). **Fixação de complemento na blastomicose.** [Complement-Fixation in Blastomycosis.]—*Mem. Inst. Oswaldo Cruz.* 1916. Vol. 8. No. 2. pp. 68–70.

The author describes the methods adopted by WIDAL and ABRAMI, MALVOZ and RICKETTS for obtaining complement-fixation in cases of blastomycosis.

The cultures used for preparing the antigen should be at least six months old, and grown upon maltose or glucose agar. The organisms are rubbed up thoroughly in a sterilized mortar with physiological solution to form an emulsion, which is then shaken at intervals for 24 hours with porcelain balls in a glass vessel, and finally filtered through paper or a Berkefeld filter. One half per cent. of carbolic acid is added for preservation. The emulsion of organisms used in making the complement test is prepared in a similar way, without trituration and filtering, and is then diluted until it is without action on guinea-pigs' serum. The author obtained a positive result as regards deviation of complement in 8 out of 10 cases of blastomycosis in man.

J. B. N.

LOW (George C.). **Emetine Diarrhoea.**—*Brit. Med. Jl.* 1917. Oct. 13. p. 484.

In reference to a paper by KILGORE & LIU [see this *Bulletin*, Vol. 10, p. 309] Dr. Low points out that in November 1915 he drew attention to the fact that emetine hydrochloride given hypodermically produced diarrhoea in many instances just as ipecacuanha in large doses used to do. He considers this a beneficent action, not a sign of intoxication; the like occurs with emetine bismuth iodide. The liquid stools are easily distinguished from the dysenteric. He has not seen peripheral neuritis.

A. G. B.

MATTEI (Charles). **Notes sur l'emploi du Chlorhydrate d'émétine.**—*Paris Méd.* 1917. Oct. 13. Vol. 7. No. 41. pp. 295–299.

After a reference to emetine diarrhoea the author gives the case of a soldier with amoebiasis and liver abscess, which caused a swelling in the epigastrium of the size of a large orange. After a fortnight's treatment (1 gm. of emetine) the swelling disappeared. Later, the patient died of pneumonia and the autopsy showed a collection of creamy semi-solid pus surrounded by a fibrous shell of the size of a walnut. His emetine results have been better with ampoules prepared in 1916 than those of 1914; i.e., old solutions are inferior to recent. Abnormal symptoms noted during the course of subcutaneous injections of emetine (220 patients) were: hypotension and feebleness of the heart's action (9 cases); the cardiac failure might be rapid or gradual; mucous expectoration, inspiratory spasm like a prolonged hiccough (3 cases), paresis of muscles especially of the neck (1 case); in two instances feebleness of legs with difficulty in swallowing; oliguria in most cases with increase of Ambard's coefficient. Of the 220 patients 204 received a total amount of less than 1 gm.: two only had transient toxic symptoms. The 16 others received 1·06 gm. to 1·50 gm. in 30–35 days; 7 had serious toxic symptoms at the end, or 5 or 6 days after cessation of treatment. The author agrees with DALIMIER that in dosage beyond 1 gm. emetine hydrochloride is a dangerous drug [see this *Bulletin*, Vol. 9, pp. 379–80].

A. G. B.

MATTEI (Ch.) & RIBON (E.). **Note sur l'élimination urinaire du chlorhydrate d'émétine chez l'homme.**—*C. R. Soc. Biol.* 1917. Nov. 10. Vol. 80. No. 17. pp. 830–831.

The authors found that in amoebic dysentery emetine appears in the urine usually 20 minutes, sometimes 40 to 50 minutes, after a subcutaneous injection. During treatment the drug is eliminated in increasing quantities, representing however only one sixth to one tenth of the quantity introduced. After treatment, periods of elimination alternate with periods in which little or none is found in the urine; this discontinuous excretion has lasted from 5 to 8½ weeks Patients who had received 0·48 gm. in 8 days were still excreting at the end of 60; it is noted that measured by Ambard's coefficient their renal function was below normal. These data, as the authors say, throw light on the accumulation of emetine.

A. G. B.

PAVA (Carlos M.). **Emetina. Consideraciones sobre algunas de sus verdaderas indicaciones.** [Remarks upon the Proper Employment of Emetine.]—*Repertorio de Med. y Cirug.* 1917. July. Vol. 8. No. 10. (No. 94). pp. 465–473.

Besides employing emetine in the treatment of amoebic dysentery after the method of ROGERS, the author has found the drug useful also in the treatment of muco-membranous colitis, in a dose of 2 to 3 centigrammes per diem, though not more so than the daily use of a purgative dose of 35 grammes of sulphate of soda. He has also found it useful in simple congestion of the liver of gastro-intestinal origin, in doses of 1 to 2 centigrammes, presumably from its favourable action on the secretion of bile. Again, in the haemoptysis of phthisis the author has found emetine very useful, a first dose of 5 centigrammes being given, with a second one of 3 centigrammes on the same day if the haemoptysis does not subside, and on each succeeding day the dose of 3 centigrammes may be repeated if necessary. [Concurrently, however, the author gives opium internally in a daily dose of 5 to 10 centigrammes, which rather detracts from the scientific value of the observation.] The author has found emetine useless in the treatment of typhoid fever, and also in two cases of pyorrhoea alveolaris.

J. B. N.

SWEET (E. M.). **The Arneth Index in Eastern Australia.**—*Med. Jl. Australia.* 1917. Sept. 22. Vol. 2. No. 12. 4th Year. pp. 243–244.

The author refers to the observations of BREINL and PRIESTLEY, who found a much increased Arneth index in children from the Northern Territory, which they regarded as an outcome of climatic conditions in the tropics as such. Sweet estimated the Arneth index in 300 Eastern Australian school children, from North Queensland (106), South Queensland (67) and Melbourne (100), and found that a high index " is very regularly present in healthy children over the whole of the coastal area of Eastern Australia," a finding which is " opposed to the view that the high index in Queensland is due to disease or to tropical climatic conditions." Possible factors were, age, occupation, race, external temperature, season, latitude and febrile states; and observations were made on small numbers of persons in various groups chosen to gauge the influence of each of these factors. As far as these figures go age, provided it is over seven, is without effect. Occupation likewise (observations on 22 soldiers and 15 students at Melbourne). Two groups of healthy Thursday Island children, one white, one black, showed no difference. No marked difference was found in Melbourne in specimens taken in January and August, the variation of temperature being 16·6° F.; nor did the wet bulb temperature seem to matter. In five persons suffering from febrile diseases the index was raised. No factor apart from disease was found definitely to influence the Arneth index. " Owing to the apparent influence of external temperature on the Arneth index of animals it would appear that further research on the influence of the external temperature on the Arneth index of man is called for."

A. G. B.

MACFIE (J. W. Scott). **Arneth Counts in Ankylostomiasis and other Pathological Conditions.**—*Report of the Accra Laboratory for the Year 1916.* 1917. London: J. & A. Churchill. pp. 43–53. With 2 charts.

In view of the fact that there is an extreme shift to the left of the Arneth count in yellow fever, the diagnostic value of which it is important to appreciate correctly, the author is engaged in collecting Arneth counts in various pathological conditions in the tropics. In ankylostomiasis (23 cases examined) he finds there is a tendency to shift to the right where symptoms of the infection are present, but when malaria co-exists the shift to left characteristic of that infection is present. In a case of blackwater fever, in which a count was made just before and four times in the course of the (fatal) illness, the respective counts were 87, 88, 88, 83, 83; these counts were similar to those obtained in malaria ; subtertian parasites were present at the first count. The counts in other pathological conditions are shown in the table.

Table IV.

Arneth Counts in Various Morbid Conditions.

No.	Disease.	Arneth classification per cent.					
		I.	II.	III.	IV.	V.	Index.
1.	Yellow fever, 5th day ..	49·0	41·5	8·5	1·0	0·0	90·5
	„ „ 12th „ ..	17·5	37·5	37·0	8·0	0·0	55·0
2.	„ „ 3rd „ ..	55·5	38·0	6·5	0·0	0·0	93·5
3.	Pyrexia of uncertain origin..	64·0	35·0	1·0	0·0	0·0	99·0
4.	„ „ „ ..	83·0	17·0	0·0	0·0	0·0	100·0
5.	„ „ „ ..	69·5	28·5	2·0	0·0	0·0	98·0
6.	Menstruation and malaria..	88·5	11·5	0·5	0·0	0·0	99·5
7.	Syphilitic iritis	2·0	27·0	50·0	20·0	1·0	29·0
8.	(?) Trichomoniasis	2·0	15·0	30·0	28·0	25·0	17·0

In the two yellow fever cases the extreme deflexion "enabled a diagnosis to be suggested early"; both were Europeans. The first "pyrexia of uncertain origin" might have been mild yellow fever. the two others were thought to be due to exposure to the sun but they also might have been yellow fever; all three were Europeans. The most profound shift to the right met with by Dr. Macfie was in the case of a native woman suffering from severe anaemia and diarrhoea who died a few days later: the faeces swarmed with *Trichomonas intestinalis*.

A. G. B.

Greig (E. D. W.). **The 'Sprouting Capacity' of Grains issued as Rations to Troops.**—*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 818–823.

The investigations of Axel Holst, confirmed by Miss Chick, have shown that the antiscorbutic value of grains can be much increased by allowing them to sprout. Samples of crushed and uncrushed grains were obtained by the author, the former from an official source, and were sprouted on moistened blotting paper in Petri dishes, the proportion that sprouted being determined at definite intervals and its effect noted on the cooking of the grain. The protocols of several experiments are given. It was found that the crushing of lentils destroys, to a considerable extent, their capacity for sprouting; uncrushed grains are therefore to be preferred. From the point of view of cooking 24 hours germination appeared to be the optimum period. Certain grains supplied to troops sprouted more freely than others. On service the grains may be spread out between clean moist blankets.

A. G. B.

Terburgh (J. T.). **De resultaten van het gescheiden vaccine-stelsel en van de systematische revaccinatie in de geneeskundige afdeeling Oost-Java gedurende de jaren 1912 tot en met 1915.** [The Results of Compulsory Vaccination and Revaccination in East Java during the Years 1912 to 1915 inclusive.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 7. pp. 1029–1058. With 3 figs.

A table facing page 1,054 of this paper shows that, as the result of compulsory vaccination in the medical administrative district of East Java, the incidence of smallpox was reduced as follows:—

Number of cases per million of population.

1912	350	1914	55
1913	470	1915	5

that is to say, the disease was practically suppressed. The major part of the paper is taken up with statistical details of no general interest.

J. B. N.

Bussière (Fr.). **Le coup de froid chez les tropicaux; ses conséquences pathologiques.**—*Ann. d'Hyg. Publique et de Méd. Légale.* 1917. Jan. 4 Ser. Vol. 27. pp. 29–34.

The expression "coup de froid" is suggested by "coup de chaleur" or heat stroke, and signifies the action of cold on tropical natives, not protected by heredity or acclimatisation, brought straight to temperate climates. There result either acute attacks of malaria, liver infection or, above all, infection of the lungs and bronchi. Pneumococcus infections are the most frequent and severe [see above, p. 226]. The present paper deals only with one clinical manifestation—albuminuria. The author was responsible for the hygiene of a camp at Frejus-Saint-Raphael and for the hospital at Galliéni, the latter containing Senegalese. Here the urine was examined on admission in every instance. In the case of pneumonia albuminuria was invariable; of 158 patients all had it. Twelve, or 7·5 per cent., died. There was polyuria and casts, never blood. The albumin appeared with the pain in the side. and lasted as long as the pneumonia. Both obviously had the same causes: "coup de froid" and infection by the pneumococcus. The 12 autopsies showed that the pneumococcus was always present in smears of the renal parenchyma, and that the kidneys were large, red, congested, with non-adherent capsule; the weight was 300–400 gms. All the patients were then examined, with the result that 20 per cent. of those confined to bed showed albuminuria. This albuminuria is not as a rule persistent: it yields to treatment in 1–3 weeks; but in some instances uremia followed. As for prevention, it is pointed out that the barracks must be well protected against cold and warmed if necessary. Black soldiers should be clothed more warmly than white, with several garments in addition to woollen underclothes. A flannel band which can be wound 5–6 times round the body from armpits to pelvis is especially useful.

A. G. B.

FOUREST. **L'héliothérapie à l'Hôpital militaire du Belvédère, à Tunis.** —*Caducée.* 1917. Oct. 15. Vol. 17. No. 10. pp. 134–136. With 2 figs.

The author has studied the effect of exposure to the sun in cases of tubercular lesions of bones in wounded soldiers, especially Serbians. Details of 10 such cases are given. In 3 cases of severe diffuse cellulitis, 8 of fistula in ano, and 2 of testicular tuberculosis (details furnished), the method yielded excellent results. He noted also its good effects on skin grafts, and believes that in the future it will be extensively used, especially in North Africa where the sun always shines.

A. G. B.

TALBOT (A.). **Clinique ophtalmologique d'Hanoi en 1916.**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1917. June. Vol. 8. No. 1. pp. 22–25.

A statistical table giving the new and old attendances for all eye diseases and for trachoma from April, when the Clinic was founded, to the end of 1916 shows that of 2,689 admissions 2,272 were for trachoma, and that of 374 operations 318 were for trachoma and its sequelae. The disease has been known in Tonkin since 1910. The author proposes the organisation of travelling brigades, managed by natives trained in diagnosis and treatment of trachoma. They would treat all cases and educate the people in preventive methods.

A. G. B.

WAKISAKA (F.) **[Investigation of the Relationships of those suffering from Trachoma in a Fishing Village.]**—*Nippon Gankwagakkai Zasshi.* (*Jl. Japan Ophthal. Soc.*). 1917. Feb. 28. Vol. 21. No. 2. pp. 134–157.

[From Review by R. G. MILLS.]

The author noticed that a great number of the members of some families suffered from this disease and that in others there were few cases or none at all. Some seemed very susceptible and others were apparently quite resistant. This tendency to or freedom from the disease was apparently hereditary, being transmitted from parent to offspring and in case of intermarriage the mother's influence predominated in 80 per cent. It was noted that most of those mothers who brought a tendency to the disease with them into a family otherwise resistant were those who had come from a distance and had not been raised in that community. It seems to be a custom where practicable to secure the young wife for a boy in the vicinity and this fact has made it quite easy to trace the relationship for three or four generations back. For convenience those are called "trachoma families" who have a decided weakness toward the disease and those are "non-trachoma families" who are resistant towards it. In all, 94 families (61 main families and 33 branch families) were traced out and of these 53 were found to have been allied by intermarriage during the last four generations. Twenty-one were definitely trachoma families and 32 were not, leaving 41 uncertain or mixed. Of the 32 originally non-trachoma families 8 had never had a trachoma patient in them, whereas the remainder were gradually tending to become more susceptible through intermarriage. The prevalence of the disease can be imagined from the fact that in

11 families comprising 63 persons there were 44 affected. In another series of 42 persons every one was affected. Women are more commonly affected than men but the disease is less severe in them. In the male line of descent the disease tends to die out but in the female line it is more often perpetuated unless by the constant intermingling with non-trachoma family blood. The number of persons affected in the village is greater relatively now than it was 50 years ago but the severity is less, continuing to remain so as long as no woman with a tendency to trachoma is brought in from the outside.

A. G. B.

ANDERSON (Harry Warren). **Yeast-Like Fungi of the Human Intestinal Tract.**—*Jl. Infect. Dis.* 1917. Oct. Vol. 21. No. 4. pp. 341–385. With 6 plates & 1 text-fig.

This article, from the Department of Plant Pathology of the University of Illinois, is an important one and will be consulted by specially interested workers. After a historical review with numerous references the author describes his methods. He isolated yeasts from 85 samples obtained from 175 persons; 31 were "diarrheal" cases, 18 were pellagra, and 1 sprue. The results of the morphologic, physiologic and cultural studies of the organism isolated are given; 27 fungi were studied. The classification of the budding fungi is discussed and a key to the genera is furnished. Several new species of yeasts are described. The summary is, in part, as follows:—

"Yeast-like fungi are commonly found in the intestinal tract of man. They are of many species and, for the most part, such types as are commonly present in nature and known as 'wild yeasts.' It is probable that these yeasts are ingested with the food.

"The feces of persons suffering from gastro-intestinal disorders of various types do not yield a larger number of yeasts than those from healthy persons. There is no one species commonly present in the intestinal tract of either healthy persons or those suffering from gastro-intestinal troubles.

"In a case diagnosed by highly competent clinicians as sprue, yeast-like organisms of a single species and in great numbers were constantly present. This species is the same as the sprue organism isolated by Ashford.

"Non-pathogenic yeasts, when fed in mass, pass through the alimentary tract in a living condition and may be found in great numbers in the feces. They do not cause serious inconvenience when fed alone, and are not retained longer than the ingested food.

"The sprue organism, when ingested after being in culture for several months, is not able to cause the disease but is retained in the intestinal tract for a longer time than in the case of the non-pathogenic forms.

"The pathogenic yeasts, for the most part, are easily distinguished from the yeast-like fungi isolated from the digestive tract. None of the yeasts isolated from healthy persons or from those suffering temporary intestinal disturbances were identical with the pathogenic yeasts studied. . . .

"The yeast-like fungus associated with sprue is similar in many of its characters to *Endomyces albicans* and is possibly identical with the yeast commonly found causing thrush in children.

"The sprue organism (*Parasaccharomyces Ashfordi* sp. nov.) is easily distinguished from the 'wild yeasts' commonly found in the intestinal tract by its reactions in sugar mediums and milk; and cultural characters, such as the peculiar growth in gelatin-stab cultures and the formation of septate mycelium in gelatin hanging-drop cultures. No one of these characters when taken alone is sufficient to identify the species and any or all of them vary under some conditions."

A list of about 90 references follows. A. G. B.

WILLCOX (W. H.). **Rations in Relation to Disease in Mesopotamia.**—*Lancet.* 1917. Nov. 3. p. 677.

This is the abstract of a lecture delivered before the Amara Clinical Society. Whereas the British ration in Mesopotamia is in all respects adequate, provided that transport is free and the ration is not deteriorated by intense heat, the Indian ration shows a large excess of carbohydrate. The Indian gets 10½ lb. of atta or rice per week. Scurvy was prevalent among the Indians especially in the hot weather owing to their disposition to this disease, reduction in the supply of vegetables and the dislike of some of them to fresh meat. Of articles in the ration sour limes, potatoes, onions, spinach and fresh fruit have all a high anti-scorbutic value, tinned fruits and dried vegetables little or none. To fresh sour limes and raw potato chief value is assigned; the potatoes are cut into small slices and eaten with onion and vinegar. Beriberi occurred in British troops but not in Indians. The British flour had been deprived of the aleurone layer and germ of the grain; the atta contained both. Bread made of a mixture of atta and British flour is very palatable and protective against beriberi. An extract of yeast was served out to the troops and [post or propter] in the following season there was little beriberi.

A. G. B.

BRUCE (David). **Camping in the Tropics.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. July. Vol. 10. No. 8. pp. 199–206. With 6 figs.

The greater part of these notes deal with the tent and its accessories. Diagrams show how the verandah of the ordinary double-roof ridge tent may be made into a fly-proof room. It is recommended that the mosquito bed net should be adapted to the shape of the tent, i.e., its roof be parallel with the slope of the side, strong hooks being sewn on the seams of the tent. "Another improvement is to make the net into a closed bag by sewing it to a floor or base of calico. . . . Altogether it is the easiest managed, the safest, and the most comfortable net for a camp bedstead." [The reviewer, who used such a net for six years, can confirm this.] The mattress is placed within and the occupant enters through an opening in the side.

Under the heading Protection from tsetse and other biting flies, a useful headpiece is described and figured. It is made with stiff native string by means of knitting needles one-third of an inch in thickness, covers the head and part of the face and extends well down on the chest and back. It is like chain-mail and well-ventilated. The interstices, through which a tsetse could creep, are closed by a layer of coarse mosquito netting sewn on the surface. This headpiece is of special value in cycling. Similar fingerless gloves can be made. The paper is a useful one.

A. G. B.

SIMPSON (W. J.). **The Vizor Antimosquito and Fly-Proof Headgear. Invented by Mrs. W. J. SIMPSON.**—*Trans. Soc. Trop. Med .& Hyg.* 1917. June. Vol. 10. No. 7. p. 140. With 1 plate.

This fly-proof vizor "is worn underneath the hat or helmet or alone, and is designed for sleeping in when the hat or helmet is taken off."

It can be folded in small compass. Its construction is seen in a photograph and it is procurable through the Army and Navy Stores.

A. G. B.

VAN DEN BRANDEN (F.). **La roussette, *Cynonycteris straminea*, animal de Laboratoire.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 731–732.

The author draws attention to the large fruit-eating bat, *Cynonycteris straminea*, as a useful laboratory animal in Tropical Africa. It is found in considerable numbers in forest galleries in the Congo and lives well in cages on fruits, such as bananas and papays. It is susceptible to *T. gambiense* infection as RODHAIN has recently shown [see this *Bulletin*, Vol. 8, p. 272], and may well be a reservoir of the virus of sleeping sickness.

A. G. B.

BLAU. **Die planmässige Insektenbekämpfung bei den Russen.** [The Campaign against Insects in Russia.]—*Ztschr. f. Hyg. u. Infektionskr.* 1917. May 3. Vol. 83. No. 3. pp. 343–382.

This communication corresponds only in part to its title. It contains a superficial account of similar work in Germany and elsewhere and need not be abstracted in any detail. The section headed The Role of Insects in the Spread of Infectious Disease is incomplete and not always accurate. In that headed Methods of Insect Extermination many measures against body lice are mentioned without any evidence whether they are really effective. In view of the use of shirts impregnated with chemical substances, as recently recommended [see this *Bulletin*, Vol. 9, p. 103, and Vol. 10, p. 243], it is interesting to note that the Cossacks and people of Little Russia use shirts dipped in tar or pitch and that in the Russo-Turkish War of 1827 such shirts were believed to protect against plague and typhus. In the Russian army now the "washing" is impregnated with 10 per cent. tar solution, with what success is not yet known. The Carpathian herdsmen are said to dip their linen in melted butter, which is supposed to act mechanically by preventing the deposit of louse eggs upon it.

Some figures are given of the comparative incidence of malaria in the Russian and other armies; it appears that in 1911 in the Russian army there were 27,000 cases. The reasons for the prevalence of malaria on the Russo-German front are discussed in some detail; they are said to be the great extent of swamps, the lowness of the houses and the want of cellarage, owing to which the mosquitoes hibernate in the thatch of roofs from which they cannot easily be dislodged.

In an appendix will be found recipes and methods of the preparation of various means of "Disinsection." A mixture of turpentine, insect powder, kerosine and carbolic acid of complicated preparation seems to be largely used in Russia; it is known as Malanin's solution and is sprayed in buildings; its advocates claim that it kills mosquitoes, flies, bugs and fleas.

A. G. B.

NUTTALL (George H. F.). i. **Bibliography of Pediculus and Phthirus, including Zoological and Medical Publications dealing with Human Lice, their Anatomy, Biology, Relation to Disease, etc., and Prophylactic Measures directed against them.**—*Parasitology*. 1917. Nov. Vol. 10. No. 1. pp. 1–42.

ii. **The Part played by *Pediculus humanus* in the Causation of Disease.**—*Ibid*. pp. 43–79. With 1 plate.

iii. **The Biology of *Pediculus humanus*.**—*Ibid*. pp. 80–185. With 2 plates & 12 text-figs.

i. The scope of the bibliography is described in the title; 639 publications are enumerated. "Reference to the really old literature has been omitted."

ii. This paper relates chiefly to typhus fever (14 pages) and relapsing fever (8 pages). As the facts are by no means well known and the account here given may be regarded as authoritative, the summary of this portion is reproduced in the sections dealing with those two diseases.

iii. It is not possible to summarise this paper, which deals with the prevalence and modes of dissemination of *Pediculus humanus* and its special biology, and contains an account of the original and ingenious methods used by the author. A summary of the work of others is given under each sub-heading and then an account of the author's own experiments. The paper will be found very interesting and is of special value to those who have to control typhus or louse-transmitted relapsing fever.

A. G. B.

FOREMAN (F. W.) & GRAHAM-SMITH (G. S). **Investigations on the Prevention of Nuisances arising from Flies and Putrefaction,**—*Jl. Hygiene*. 1917. Oct. Vol. 16. No. 2. pp. 109–224. With 5 plates, 4 text-figs. & 3 charts.

This monograph completes a number of the *Journal of Hygiene*. After a section headed Preliminary investigations, on the destruction of adult flies, eggs and larvae, some fifty pages are occupied by an account of investigations on Putrefaction. Then follows a section on experiments on maggots and exposed carcases, while the last section is on the Control of nuisances due to flies and putrefaction, especially such as arise in Public Health practice or in war. From the conclusions of this section the following are extracts:—

> "6. Manure should be treated by spraying with creosote oil at the earliest opportunity. If made into heaps each incremental addition should be spread uniformly on the heap and sprayed at the rate of at least 100 cc. per horse per day. The manure does not seem to be injured by this treatment.
>
> "8. The chief objections to the use of creosote oil for such purposes are (a) its irritant action on the skin and mucous membranes, (b) its inflammability and (c) difficulties in transport. In view of the excellent results obtained the objections are of little importance. In our experience its irritant action on the skin is very slight, and the eyes can be protected by the use of glasses when spraying; its inflammability is low except when used as a spray, and suitable precautions could be easily employed. The difficulty and cost of transport have to be weighed against the economy in labour, since a single treatment with creosote oil is more efficient than many with 5 per cent. emulsions of disinfectants."

The General Summary is reproduced with the exception of that part which treats of the nature of putrefaction.

"1. Flies may be killed either by poisons (a) absorbed from the alimentary tract, or (b) acting through the respiratory system. They are very resistant to many alimentary poisons which possess considerable toxicity to animals, but are more susceptible to respiratory poisons.

"2. As very little difference could be made to the general fly population by killing adults alone we have not persisted with experiments designed for this purpose. Aniline is the most suitable of the reagents, not dangerous to man, used in the way suggested, which we have tested.

"3. Flies are most easily and effectually destroyed by attacking them in their immature stages as eggs or larvae.

"4. The eggs of species likely to be dangerous to man by conveying infected material to his food are laid on (a) exposed animal matter, (b) manure, and (c) refuse.

"The eggs and maggots in these situations may be considered to represent large numbers of flies in traps.

"5. For killing eggs or larvae in their breeding grounds we have found coal-tar oils, especially creosote oil, to be the most satisfactory reagents. Aniline emulsions are useful, but have little effect on putrefactive processes and the nuisances due to them.

"6. Flies may be repelled from substances which attract them, such as decaying bodies, faecal material, etc. and kept out of habitations by means of the repellent constituents of coal-tar oils.

"7. Flies sprayed with these oils are killed.

"14. In the superficial treatment of intact or opened carcases and other putrescible materials reagents should be used which adhere to the greasy surfaces, form films, render the skin waterproof and kill the bacteria in it, thus checking putrefaction by preventing the access of water and putrefactive bacteria to the tissues. Further the reagent should be capable of eliminating any stenches which may arise, repelling flies, killing the eggs or larvae, resisting the action of water and remaining operative in all respects for a long period.

"15. Watery emulsions of disinfectants are necessarily deficient in most of these properties. Undiluted oily reagents only possess them.

"16. By superficial treatment combined with injection of certain reagents into the blood vessels exposed carcases may be preserved for months.

"17. The burial of carcases does not prevent the development of larvae present on them, or the subsequent emergence of the flies.

"18. In our experience the reagent, which possesses the required properties to the greatest extent, and gives the most satisfactory results in practice and is sufficiently cheap and easily obtained for use on a large scale, is coal-tar creosote oil of 'country make.'

"19. For general purposes, especially when the repelling of flies is of importance, we recommend the use of coal-tar creosote oil of country make, containing a high percentage of phenolic bodies, to which sufficient bases, extracted from 'light oil,' are added to make the proportion of bases to phenolic bodies approximately one to two."

A. G. B.

Hill (Gerald F.). **A Report on some Culicidae of the Northern Territory.**—*Bull. Northern Territory of Australia.* 1917. Jan. No. 17. 8 pp. With 16 plates & 1 map. Melbourne: Albert J. Mullett. Government Printer.

This Bulletin gives the results of 3½ years work. The author collected 26 species which are named, and 6 which remain to be determined. Notes of distribution and habits are given. *Nyssorhynchus annulipes* Walker, which seems to be the carrier of malaria in that part of the world, is widely distributed, "somewhat scarce near the littoral and fairly abundant in certain inland localities." Nine such are given.

The larvae are generally found in stagnant pools and hence are more prevalent in the dry season than in the rains. It is nocturnal as well as diurnal and in open country near pools attacks man for an hour or two before sunset. The larvae are not uncommon at Darwin, but few reach the adult stage owing, it is believed, to predaceous insects; owing to the scarcity of imagos malaria has seldom, if ever, arisen *de novo* at Darwin. *Culex fatigans* is very troublesome at Darwin. *Stegomyia fasciata* is well established on the coast and is being spread inland by the railway. With the former it is often seen in the carriage lavatories. The breeding habits are the same as elsewhere and do not need repetition. During an epidemic of dengue in 1914 at Darwin *S. fasciata* was extremely numerous. Photographs show the breeding places of several species and a map is appended.

A. G. B.

MACFIE (J. W. Scott). **The Identifications of Insects collected at Accra during the Year 1916, and other Entomological Notes.**—*Report of the Accra Laboratory for the Year 1916.* 1917. London: J. & A. Churchill. pp. 67–75. With 3 plates, 3 text-figs. & 1 map.

A map is given showing the distribution of *Stegomyia fasciata* in the Gold Coast, as far as at present known; it is noted that the entries are surprisingly few. A list is furnished of the insects collected at Accra during 1916, exclusive of those enumerated in the Report for 1915; 14 names have been added to the list of mosquitoes, making 55 in all; some typical breeding places are shown in photographs. Interesting notes follow on the natural foes of mosquito larvae. Among these were a Notonecta, the larvae of water beetles, a small crab and a voracious fish found in a pool which seemed an ideal haunt for larvae but contained none. The gregarine *Lankesteria culicis* Ross (figured) was found in three samples of *S. fasciata* larvae out of 11; it is believed to have no ill effect on the development. Of 33 house-flies collected in butchers' stalls 14 were infected, many heavily, with *Herpetomonas muscae domesticae.* A specimen of *Cordylobia rodhaini* was bred from a larva found in the forearm of a native.

A. G. B.

PITTALUGA (G.) & DE BUEN (S.). **Nota sobre los dipteros del género "Phlebotomus" en España.** [Note on the Diptera of the Genus Phlebotomus in Spain.]—*Bol. Inst. Nac. Higiene de Alfonso XIII.* 1917. June 30. Vol. 13. No. 50. pp. 137–145. With 3 plates.

Of the five European species of Phlebotomus the authors have found three in Spain and its dependencies as follows:—

P. papatasii in Malaga and Palma de Mallorca.
P. minutus in Malaga, Palma de Mallorca and Granada.
P. legeri in Malaga and Palma de Mallorca.

The first and last also in Spanish Guinea.

From the blood and liver of geckos (*Platydactylus mauritanicus*) the authors have been able to cultivate forms of *Leptomonas* identical with those found in Oriental sore, from which fact they think it probable that the gecko may serve as a reservoir for the parasite of Leishmaniasis. The gecko exists in all the localities in Spain in which Phlebotomus has been recognized.

J. B. N.

TAKATSUKI. **An Essential Property of Petroleum for Mosquitoe Control.** [Japanese Text.]—*Kyoto Igaku Zassi.* 1917. Nov. Vol. 14. No. 7. [Author's Summary p. 84.]

The author says that "the cause of death [of the mosquitoes] is not a simple mechanical suffocation that will occur when the breathing pores are stopped." It is suggested that the surface of the breathing siphons and respiratory apparatus is covered with an epithelial membrane which has a "special chemical affinity with petroleum"; the membrane is easily stained with petroleum solutions of dyes but not with watery solutions. Hence it is not necessary to cover the whole surface of the water with petroleum; 26 cc. of kerosene to every square metre was found "sufficient to destroy almost all larvae and pupae during the summer time." The larvae and pupae of the late autumn were more resistant. [On the subject of kerosene as a larvicide cf. MACFIE, this *Bulletin*, Vol. 9, p. 367.]

A G B.

BOOK REVIEW.

DANIELS (C. W.) [M.B., F.R.C.P.] & NEWHAM (H. B.) [M.D., M R.C.P., M.R.C.S., D.P.H., D.T.M. & H.]. **Laboratory Studies in Tropical Medicine.**—xv + 560 pp. With 6 coloured plates, 164 figs. & 7 charts. Fourth Edition. Thoroughly revised, with new and additional illustrations. 1918. London: John Bale, Sons & Danielsson, Ltd. [Price 21*s.* net.]

We may express firstly our opinion of this book that it is inconveniently arranged, that its matter is diffusely presented, that much of it is of too elementary a character to be of practical value, or if we take it for granted that the information is intended for the beginner, that he will often not understand it, that on several important subjects no information is afforded, and that erroneous matter is not inconsiderable. We shall endeavour to give reasonable grounds for holding this opinion. As regards arrangement we find for example micrometer scales and measurements described on pp. 13–15 and again pp. 456–457. On pp. 28 *et seq.* we find six or seven fixatives given, but sublimate alcohol is not mentioned, though if our memory is correct it occurs somewhere in the book but as it is not given in the index we have been unable to find it again. In this chapter (II) on fixation and embedding the time given as necessary for passing a tissue through paraffin is 7 days, whereas the process can readily be done in 7 hours if needs be. The time for the fixation of a blood film (p. 51) is given as 10 minutes or more whereas anyone can convince himself that 10 seconds or less is sufficient. Again the staining of a cestode proglottis (p. 360) occupies some months, whereas "overnight" is all the time that is required to give specimens showing everything possible in a "total preparation." We find however on p. 499 (and this illustrates the inconvenience of arrangement) another method for staining cestodes, but as given it apparently applies to live cestodes only.

We all agree that a knowledge of normal blood is necessary for the student of pathological blood. On p. 69 we find the remarkable statement that lymphocytes contain no granules (chromidia or "azurophil" granules) in their cytoplasm, whereas large mononuclear leucocytes (normocytes) do; the granules in these latter being coarse or fine. If the authors arbitrarily define lymphocytes in this way, they stand so far as we know alone, as a reference to the text books of haematology will show. The matter is of importance in connection with the large mononuclear count in malaria, etc., because counts made on this basis will differ enormously from those of observers who follow other criteria in defining lymphocytes and monocytes. Nor do we think that the authors can have made many relative counts in the way they recommend, viz.: "the edges of the film where leucocytes are most numerous should not be included in the enumeration." In addition to the great labour and strain involved in such a method of counting, owing to the scarcity of leucocytes in the parts away from the edges, we have reason to believe that the method will give erroneous results. A comparison of Plate V. figs. 3–13, with a well stained blood film must convince anyone that these figures are inadequate and indeed erroneous representations of the characteristics of various leucocytes, more especially in the case of the myelocytes. We find no reference to the Arneth count. On p. 49 pictures are given of the making of films, but we think the fact should have been pointed out that there is no real advantage in pushing over pulling the blood drop. Our experience is that precipitate is *not* avoided by inverting the slide in the stain; it is the length of time of staining and the brand of stain that are the factors. The great dangers, owing to the débris present, of "thick films" for the inexperienced are not sufficiently emphasized, and we frequently prefer to examine thick films with the haemoglobin *undissolved* for with some practice parasites are, if present, readily seen. Acetic-alcohol is preferable to water as a solvent of haemoglobin for it is a delicate fixative and the resulting film is far cleaner and the staining is equally good. We find no mention among the "deceptions," p. 98–101, of "Cabot's rings," a very common feature in certain blood films, nor of "falciform bodies," nor of leucocyte fragments—spherical pieces of leucocyte cytoplasm deeper stained at the periphery than in the centre, most puzzling to the novice, nor yet of "anaplasmata," "paraplasmata," "centrosomes," etc., all of importance, for they are appearances commonly met with and which the student must be made aware of. In regard to thick films used in detecting filarial embryos, on p. 132 it is said, "when quite dry place in water." It should have been explained what the authors mean by "quite dry." If an ordinary thick film apparently "quite dry" is placed straight away in water, disaster will ensue only too often, i.e., the film will entirely disappear, or flake off, but if kept over night or for some hours (? in an incubator) till "really quite dry" then they may be safely treated. The successful staining of filarial embryos with haematein depends in our experience not on *warming* the stain, but on actually bringing it to the boil.

The description of the piroplasmata (p. 104) and that of the trypanosomes (p. 114) are very inadequate outlines of the matter. All the information given about *P. bigeminum* is the fig. 24, Pl. IV, which is not characteristic, and figs. 25–27 are vaguely termed sporozoa in cattle. As none of the piroplasmata are pathogenic to man, this may be considered adequate, yet the trypanosomes hardly receive more detailed description. It is not even stated that *T. gambiense* has long and short forms, the figure given being that of a long form. *T. uniforme* and the widespread *T. vivax* are not mentioned though other animal trypanosomes are. It is said that much reliance cannot be placed on inoculation experiments as a means of differentiation of species, but the dangers of graphs of lengths of trypanosomes are also great though not pointed out. The classification of Leishman-Donovan bodies as a parasite found in blood plasma is peculiar. The term Leishman-Donovan body (an antique expression) is still used without any reference to specific names and we find no mention of Leishmaniasis in children or in dogs or of the nasopharyngeal forms.

On p. 382 we find it stated that of protozoa found in the stools *Amoeba coli* "is of the most importance." On p. 384 "the *Entamoeba coli* (*A. coli*) is now generally held to be non-pathogenic." The description of the amoebae and indeed of other organisms in the stools is poor and the illustration of *A. coli* (Plate VI) is, to say the least, peculiar. In chapter VII the statement that various nematode worms in horses and other animals cause "verminous aneurisms," conveys practically no information; also that the adults of the human filaria are found in various parts of the body is vague. The researches of the last six years or so on the structure of filarial embryos are not given, and the fact that much can be made out by Romanowsky stain which is not shown by haematoxylin. "Very dilute solution of stain," "well diluted haematoxylin," are hardly precise enough directions for the inexperienced. We have not found any reference to BAHR'S observations on the mode of entry into the body of the embryos. We have had no experience of microscopic examinations of blood for bacteria but on general grounds we should consider it waste of time, as certainty can only be obtained by other means, and not always without difficulty.

As another example of inconvenience in arrangement, *F. loa* is mentioned in this Chapter VII, but its alleged conveyance by *Chrysops* occurs in Chapter XIII. No hint is given of the existence of the genera *Loa* and *Acanthocheilonema*. In Chapter XXI we meet *Filaria bancrofti* again in connection with chyluria. As regards the latter practically nothing is said and information on the important question of "fats" in chyle and lymph is wanting. It is not correct to say that haemoglobinuric urine is clear, because "haemoglobin" casts are of course present when passed.

We find the bacteriology of plague and dysentery are omitted, nor do we find the bacilli mentioned in the index. *Streptothrix madurae* is the only organism of Madura foot mentioned, a defect which leaves the student stranded just when he would be glad of help in a difficult subject. On p. 574 we find the extraordinary and totally erroneous statement that it is best to examine nematodes unstained and describe them as they appear in the fresh condition mounted in normal saline. The helpful and extremely rapid method of clearing in carbolic acid is not mentioned. The description of the Nematodes appears to us inadequate; e.g., the illustration of the head of *N. americanus* only bears a faint resemblance to reality and the margins of the dorsal cleft of *A. duodenale* are so exaggerated that they resemble teeth. The other two figures on the page are of no practical value.

The genera *Fasciolетta* and *Cladorchis* still appear among the Trematoda though it is many years since it has been shewn that the species concerned do not belong to these genera. The spermatheca and Laurer's canal are mentioned on p. 365 but are not shown in the schematic Fig. 146. The pages (5½) dealing with the Cestoda open abruptly with hydatid cysts, but no explanation is given of their development, a matter on which the student very frequently has no clear idea. As important as the hooklets in the cysts and more readily found is "hydatid sand" consisting of brood capsules and scolices. The presence of *Cysticercus cellulosae* in man is not mentioned.

The index is poor; e.g., neither under *Glossina* nor under Tsetse-fly do we find a reference to p. 202, where a table of species is given, but only 9 of the 16 known species are mentioned and nothing is said of the important characters of the genitalia. In this and in many other cases there is an absence of real revision. So that we do not consider the authors have been successful in their endeavour "by judicious revisions and additions to as far as possible bring the book up to date" (Jan. 1918) and as a detail it may be pointed out that the book was published in 1917 although it bears the date 1918.

Our opinion is that this book contains much elementary matter which is better conveyed and indeed only effectively so by personal teaching in a laboratory. Of more advanced matter which the student thus taught could himself assimilate, the book contains too little. The best portions are we think those dealing with bacteriological technique and chemical analysis.

J. W. W. Stephens.

We much regret to record the death of Dr. F. M. SANDWITH, C.M.G. Dr. Sandwith became Sectional Editor for Pellagra in 1912, and, as readers are aware, treated the perplexing literature of that subject in a most efficient as well as agreeable manner.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

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AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

MACADAM (William). *Entamoeba histolytica* **Infections: Their Prevalence among British Troops in India and Mesopotamia, with Special Reference to the Question of "Clearing."**—*Lancet*. 1918. Jan. 5. pp. 15–19.

This paper is a preliminary account of the results of an inquiry based on the protozoological examination of stools of men invalided for various ailments from Mesopotamia to India.

It was found that the stools of patients in several of the surgical wards revealed a higher percentage of *histolytica* cysts than did those of patients who were being "cleared" in the dysentery wards. The prevalence of *histolytica* infections among the troops was therefore investigated. In a series of 946 men, 351 were at the time of stool examination in the "non-dysentery" wards of the hospital and 595 were convalescents stationed in a convalescent depot. *Histolytica* cysts were present in 13·6 per cent of the 351, and 17·8 per cent. of the 595; this being the result of a single examination. These figures by correction could probably be increased to 34 per cent. for the non-dysenteric group and 44·5 for the convalescent group. That is to say that one third at least of the men in the ordinary wards of the hospital and of the men who have been ill but are now considered fit for duty are *histolytica* carriers. The number of carriers is greater among those who have shown symptoms of an intestinal infection than among those who have been unaware of their protozoal infection, as indicated by the following tables.

Table I.—Classification of *Histolytica* Carriers among 351 Hospital Patients Based on Presence or Absence of a History of Dysentery.

	Number.	Carriers.
Previous history of dysentery or diarrhoea	218	41 = 18·8%
No previous history	133	7 = 5·2%

Table II.—Classification of *Histolytica* Carriers among 595 Convalescents, Based on Presence or Absence of a History of Dysentery.

	Number.	Carriers.
Class A.—No dysentery or diarrhoea	154	19 = 12·3%
Class B.—Remote history of dysentery or diarrhoea	246	49 = 19·9%
Class C.—Recently discharged from hospital after dysentery ..	195	38 = 19·4%

The authors make comments upon the value of negative examinations of patients who are living under a hospital régime. They were impressed by the fact that patients who had been discharged from hospital and had, owing to error in diet, brought on an attack of diarrhoea gave more frequent positive results. They followed up this question. Twenty known carrier cases were examined after leaving hospital as "cleared." The average number of negative examinations after emetine treatment and before the patients were discharged from hospital was five and at the time of discharge the patients' condition of health was satisfactory. At the very first examination after the men went to the convalescent depot, 10 were found to have relapsed while 5 others shewed cysts at the second or third examination. In only 3 out of the 20 cases was there no evidence of *histolytica* infection after seven consecutive stool examinations.

MacAdam's conclusions include the following:—

> "7. This wide prevalence of infection due to *Entamoeba histolytica*, coupled with the fact of the proved ineffectiveness of our present therapeutic methods for the destruction of cysts, throws considerable doubt on the utility of attempting to 'clear' by a series of protozoological examinations of the stools, only those cases of amoebic infection which have suffered from so marked an intestinal disturbance as to have resulted in their receiving hospital treatment.
>
> "8. Various data have been cited showing that factors leading to the production of intestinal irritation, mild though it be, are also associated with the reappearance of *histolytica* cysts in the stools. Such factors are present under the conditions that prevail in the convalescent depôt, and doubtless exist to a much greater extent during active service in the field, in sharp contrast to the conditions of a hospital régime."

B. Blacklock.

CIAURI (Rosolino). **Dissenteria amebica.**—*Giorn. di Med. Milit.* 1917. Nov. 30. Vol. 65. No. 11. pp. 934–941. With 1 plate.

The author states that his observations in 990 cases from Macedonia and Lybia lead him to certain conclusions which he gives in this paper, and which are treated in a general way, few details being given. He made some experiments to ascertain whether faeces of amoebic dysentery cases were capable after filtration of producing dysenteric symptoms or lesions in kittens and guinea-pigs. Subcutaneous and intrarectal injections were used, and no dysenteric signs appeared, but the animals injected subcutaneously died early. Non-filtered material from the same source produced dysentery when injected rectally.

He discusses fully a case presenting the following features. The patient became ill in September 1916, in Lybia, with dysenteric symptoms. He recovered partially without special treatment but had several relapses until February 1917, from which time he remained in hospital until July. In the faeces were found amoebae and cysts. The author describes these and says "it seems that all the morphological structures of this amoeba agree in most points with the morphology of *Loeschia coli* (little or no differentiation between ecto and endoplasm, vacuolization of protoplasm, cysts with eight nuclei); where it differed from the ordinary *Amoeba coli* was in its definite property of ingesting besides bacteria and detritus, red cells, and in the fact that it was the only parasite which could be found in this case to account for dysentery of long standing." He has observed that the power of ingesting red cells is lost by those amoebae which are refractory to administration of emetine.

Kittens were injected rectally with the faeces of the patient and one of them died in thirteen days. The conditions found at autopsy were :—Early rigor mortis, rectal prolapse, redness of the peritoneum, intense redness with great swelling of the mucosa of the sigmoid and rectum with punctiform submucous haemorrhages, superficial ulceration of the mucosa; tumefaction and congestion of liver and spleen, tumefaction of the pancreas, enlargement of lymphatic glands; kidneys enlarged and congested with loss of cortico-medullary line of demarcation, heart large with dark fluid blood, slight general congestion of the lungs. The author states he will as soon as possible furnish a description of sections. Amoebae perfectly similar to those found in the patient's faeces were present in material from the mucosa of the kitten's colon. Vesicular bodies and vacuoles of large size were found in the amoebae in the kitten which were not seen in the amoebae from the patient.

The author concludes that in the absence of important zoological facts such as the character of multiplication we do not at present possess sufficient data to enable us to establish different species of dysentery amoebae, that *Amoeba coli* may in certain circumstances assume the power of producing dysentery, and that a basic character for determining pathogenic properties in amoebae is the power of ingesting red cells.

B. B.

GABBI (Umberto). **Dissenteria amebica.**—*Malaria e Malat. d. Paesi Caldi.* 1917. Sept.-Dec. Vol. 8. No. 5–6. pp. 218–240. With 6 text-figs. & a map.

In this paper the author reviews the whole subject of amoebic dysentery in a study which will be of use for those who are commencing the subject. It is not a record of any original work, but rather a summary of the views of those who have been engaged for many years in the study of amoebic dysentery.

B. B.

MARTINEZ (Fidel F.). **La dysenterie tropicale en Espagne.**—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 904–915.

In previous papers, states the author, he recorded his discovery in South Spain of infantile kala azar, hitherto classed among splenomegaly with anaemia, also the first case of beriberi in Spain and many cases of Oriental sore, pellagra, etc. The present paper deals with amoebic dysentery and the author, who had already come to the conclusion that amoebic dysentery is endemic in certain parts of Spain on account of the specific action of emetine in his cases of dysentery, found the amoeba in human stools and infected kittens by the rectum. He has now more than 50 cases which prove the endemicity of the infection. The major part of the paper is concerned with accounts of cases and general observations on symptoms and treatment.

B. B.

POPPER (Hugo). **Ueber den Erreger der galizischen Ruhr.** [The Cause of Dysentery in Galicia.]—*Wien. Klin. Woch.* 1917. Nov. 8. Vol. 30. No. 45. pp. 1413–1415.

Dysentery has become widely spread in Eastern Galicia in recent months. Dysentery bacilli can only rarely be recovered from the stools, but in nearly every case an amoeba, differing in certain respects both from *Amoeba coli* and *Amoeba histolytica.* Popper describes this amoeba, both in its vegetative and encysted condition, and considers it to be the cause of the dysentery. As amoebae have not hitherto been recognised as the cause of epidemic dysentery in Europe, he proposes for his amoeba the name *Entamoeba dysenteriae europaeae.*

F. E. Taylor.

SPEARES (John). **Some Preliminary Points in the Diagnosis of Amoebic Dysentery.**—*Dublin Jl. Med. Sci.* 1918. Jan. 3 Ser. No. 553. pp. 6–11.

The author considers that in dysentery naked eye examination of stools to determine whether the case is due to *E. histolytica* or is bacillary in origin, is useless. He lays stress on temperature as of diagnostic value, and then proceeds to give a description of the technique which he uses in the diagnosis of cysts. Some observations on hepatitis and liver abscess conclude the paper, the author stating that in these conditions the diagnosis should not depend on laboratory examination of the stools, and he draws attention to the fact that puncture of the abscess will not provide material suitable for microscopical diagnosis unless a portion close to the abscess wall be examined.

B. B.

BRUG (S. L.). **Les kystes des amibes intestinales de l'homme.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 799–803. With 6 text-figs.

The author passes in review the differential points which have been made very frequently in the past between *E. histolytica* and *E. coli,* both in vegetative form and in cyst form. One by one he discards them as of no diagnostic value. He states clearly that cysts of amoebae which are the cause of dysentery may have 8 nuclei, also that cysts of what should be undoubted *Entamoeba coli* (some having 16 nuclei) may possess chromidial bars. "In fact" the author states "we see that among the so-called characteristic points there is not one which is not contested." [The table at the end of this paper in which are set forth the points by which the cysts of *E. histolytica* and *E. coli* may with reservations, be differentiated, appears somewhat unnecessary in view of the preceding statements.]

B. B.

NOC (F.). **Prophylaxie de l'amibiase intestinale par l'ipéca total glutinisé.**—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 868–870.

In amoebic infection of the intestine no remedy is known which effects a *Therapia sterilisans magna.* Therefore it is of value to discover whether prophylactic measures can be adopted to prevent infection or relapse. The author at Saigon tried the effect of ipecacuanha in the form of "pilules d'extrait total glutinisées," which contain each 26 mgm. total extract of ipecac corresponding approximately to 15 mgm. of emetine. In a healthy man one to three daily for long periods produce no constipation nor diarrhoea. Vomiting is never produced even by the dose of 8 pills a day. They dissolve entirely in the alimentary tract. The author tried them on two healthy subjects and on 20 amoebic dysenterics and considers the effect should be studied accurately for long periods in tropical countries.

B. B.

BOUYER. **Crises de dysenterie amibienne après vaccination antityphique chez un porteur de germes.**—*Paris Méd.* 1917. Sept. 22. Vol. 7. No. 38. pp. 255–256.

A soldier who had lived in an endemic area, but had presented no evidence of amoebic dysentery, had an acute dysenteric attack a few hours after each of two antityphoid vaccinations. The first was given in 1911, the second in 1916, the resulting symptoms being on each occasion colic with diarrhoea and the passing of blood and mucus. On the second occasion amoebae were found in the stools. No dysenteric symptoms occurred in the interval of four years between the injections.

B. B.

JEPPS (Margaret W.) & MEAKINS (J. C.). **Detection and Treatment with Emetine Bismuth Iodide of Amoebic Dysentery Carriers among Cases of Irritable Heart.** (Report to the Medical Research Committee.)—*Brit. Med. Jl.* 1917. Nov. 17. pp. 645–648.

Sixty-five cases of irritable heart were examined as regards presence of *E. histolytica* in the faeces. No selection of the men was made from the point of view of history of dysentery, but twenty-five cases had a definite history of an acute attack. *E. histolytica* was present in twenty-four cases out of the sixty-five, six examinations being carried out before declaring a man uninfected. It is noted that small (6 to 10 μ) cysts only were found in twelve out of the twenty-four cases. Treatment with preparations of emetine bismuth iodide in stearin-coated tablet and pill form was unaccompanied by vomiting but in eight cases severe diarrhoea and abdominal cramps occurred. In eleven cases treated with the drug in cachets nausea and vomiting occurred in all. The curative results obtained were in favour of the last mode of administration, 10 of the 11 cases being cured. The effect on the patients' heart condition of the removal of the amoebic infection was studied. Of a total of twenty [? nineteen] infected cases which were cured, eleven showed a conspicuous improvement, nine showed little or none. The test applied was graduated exercise.

Methyl-psychotrine, a new alkaloid prepared from ipecacuanha by Dr. F. L. PYMAN, was tried in two cases with negative results. Some observations on differential leucocyte counts are added.

B. B.

LAMBERT (A. C.). **The Treatment of Amoebic Dysentery with Emetine and Bismuth Iodide.**—*Brit. Med. Jl.* 1918. Jan. 26. pp. 116–118.

The patients, 40 in number, who were treated were Indians and it was found that they tolerated the drug well, although keratin capsules were not available. A pill containing two grains was given once or twice daily, half an hour after milk. The author classifies his cases into acute, subacute and chronic relapsing, the diagnosis being made and the results of treatment observed microscopically. He found that attempts to use emetine bismuth iodide alone in acute cases did not give good results, but that combined with hydrochloride injections it proved effective.

B. B.

DALE (H. H.) & DOBELL (Clifford). **Experiments on the Therapeutics of Amoebic Dysentery.**—*Jl. Pharmacol. & Experim. Therap.* 1917. Dec. Vol. 10. No. 6. pp. 399–459.

The authors have been successful in carrying on a strain of *E. histolytica* in kittens for forty three passages over seven months by rectal injection. The strain was then perfectly active and unaltered and was voluntarily abandoned. The material was derived from a patient who was suffering from subacute dysentery, and it contained "a small amount of blood and mucus with active *Entamoeba histolytica* but no cysts." The procedure adopted for carrying on the strain was to kill the experimental animal on the appearance of the terminal symptoms of collapse, and take material direct from the large intestine. The material consisted of the slime and ulcerated mucous membrane scraped off and emulsified in saline solution (0·9 per cent. solution of sodium chloride in London tap water) by drawing up into a Record 10 c.c. syringe repeatedly. The syringe was connected with a straight glass rectal tube—7 cm. in length and 3 mm. in external diameter—by a short rubber tube, and 5 to 8 c.c. of the emulsion was injected, the animal being held head down. Introduction of live amoebae into the stomach by a tube, and into the small intestine failed to produce infection, although the amoebae used were capable of producing infection when introduced rectally. The authors confirm other observers as to the greater susceptibility of young kittens, and as to the non-production of cysts in kittens. Two monkeys (*Macacus rhesus*), rats and rabbits proved refractory.

Systematic series of observations on the action of various alkaloids *in vitro* were carried out on the kitten amoebae, for the details of which the reader is referred to the paper itself. The alkaloids included emetine, cephaeline, psychotrine, methyl-psychotrine and various derivatives. Quinine, harmaline, cusparine hydrochloride, neosalvarsan, trypaflavin, blood serum of cat, mercury succinimide, copper alanine and chaparro amargosa were also tested. Many other substances proved, *in vitro*, more potent in their lethal action on *E. histolytica* than did emetine. The authors found themselves at variance with previous observers, such as ROGERS, in regard to this action of emetine. The dilution of 1 in 100,000 which ROGERS found caused immobilization and degeneration of the amoebae within a few minutes proved of no effect. The dilution 1 in 10,000 which ROGERS found immediately lethal, was also only exceptionally productive of any effect up to 30 to 60 minutes. Even a dilution of only 1 in 100 or 1 in 200 was resisted by the kitten amoebae in some experiments for a period of 30 minutes. The subject is discussed from many points of view by the authors and they exclude by experiment such reasons as acquired emetine resistance of the strain, failure on their part to observe the phenonema of degeneration, the use of kitten amoebae instead of human amoebae, and the quality of the emetine used. The conclusion of the authors is that ROGERS' observation was fallacious and they suggest in explanation of the results obtained by him, that the amoebae in his specimen had become so enfeebled that they succumbed to emetine in dilutions which are harmless to those with unimpaired vitality. [It is of interest to recall that VEDDER himself stated that ROGERS' experiments on the action of emetine on *E. histolytica* in stools are unimportant, this *Bulletin*, Vol. 3, p 449. See also paper by WALTERS, BAKER, and KOCH, below.]

Attempts to treat amoebic infection in the cat failed and this is a fact which the authors emphasize. They consider that present views on the mode of action of emetine in amoebic dysentery require modification. They ascribe the efficacy of emetine to its action not on the amoebae, but on the host.

B. B.

PYMAN (F. L.) & WENYON (C. M.). **The Action of Certain Emetine Derivatives on Amoebae.**—*Jl. Pharmacol. & Experim. Therap.* 1917. Oct. Vol. 10. No. 4. pp. 237-241.

Culture experiments were carried out with a water amoeba of the limax type on WALKER'S agar medium. The amoeba grew freely on this when the medium was free from the drugs tested. The strengths of drug used in the medium were 1 : 1,000, 1 : 10,000 and 1 : 100,000. The results are shewn in the form of tables giving the amount of amoebic growth and the amount of bacterial growth obtained on the plates. The culture test gave the following division of the Emetine derivatives.

"1. The salts of emetine, cephaeline, N-methyl emetine, N-methyl cephaeline, and N-methylemetine methine were approximately equally amoebacidal.

'2. N-Methylemetine methochloride, rubremetine hydrochloride, the hydrochloride B, and noremetine hydrochloride were inferior to those of the first group in amoebacidal action.

"3. Psychotrine sulphate was much inferior to the substances of group 2."

A discussion on the constitution of the various derivatives follows. In a foot note it is stated, "Full particulars of the chemical and physical properties of these compounds are given in the papers by CARR and PYMAN, *J. Chem. Soc. Trans.* 1914. CV. 1591, and PYMAN 1917. CXI. 419."

B. B.

WALTERS (A. L.), BAKER (W. F) & KOCH (E. W.). **Pharmacologic Studies of the Ipecac Alkaloids and some Synthetic Derivatives of Cephaeline. III. Studies on Protozoocidal and Bactericidal Action.** —*Jl. Pharmacol. & Experim. Therap.* 1917. Nov. Vol. 10. No. 5. pp. 341–364.

The Sections on Protozoa deal with the action of the drugs on water amoebae, on *Endamoeba buccalis* and Paramoecia. Full details of a large series of experiments are tabulated for each section. The authors conclusions are reproduced below.

"Emetine hydrochloride in solution of 1 : 1000 when acting on water amebas for one hour, or in solution of 1 : 5000 acting for three hours. destroyed many of these organisms but was not uniformly amoebacidal.

Emetine hydrochloride in solution of 1 : 200,000 in contact with cultures of amebas for one hour, four hours, or seven hours destroyed many amebas, but transplants from these cultures to fresh agar plates showed a retarded or delayed growth of amebas, due probably to the development of encysted or resistant forms.

"Emetine hydrochloride in solutions as strong as 1 : 100 are not rapidly destructive to the endameba buccalis, in some cases not killing them in one hour.

"The propyl and iso-amyl ethers of cephaeline are stronger than emetine as amebacides but their action on water amebas or the Endameba buccalis cannot be used satisfactorily as a comparative measure of this action.

"Methylating cephaeline to form emetine is known to increase the endamebacidal action as well as the protozoocidal action towards paramecia and the substitution of the methyl group by ethyl, propyl, butyl, iso-amyl, or allyl further intensifies this action.

"The propyl, butyl and iso-amyl ethers of cephaeline possess much stronger protozoöcidal properties than the methyl ether (emetine). Cephaeline iso-amyl ether phosphate was the most effective alkaloid of this group in killing paramecia, being fifteen to twenty times as active as emetine phosphate."

B. B.

SANGIORGI (Giuseppe). **La colorazione vitale per la dimostrazione delle cisti dell' *Entameba coli* e dell' *Entameba dissenterica*.**—*Pathologica.* 1918. Jan. 1. Vol. 10. No. 219. pp. 9–10.

The author recommends MEYROWSKY's alcohol methylene violet for use in staining cysts for diagnostic purposes. A drop of water emulsion of the faeces to be examined is placed on a slide on which the stain has been spread in a thin film and dried,—and a cover slip is applied. Where cysts are rare he recommends CROPPER and ROW's method of concentration [this *Bulletin*, Vol. 9, p. 421].

B. B.

CUTLER (D. W.) & WILLIAMSON (R.). **A Rapid Method for the Differentiation of the Amoeboid Forms of *Entamoeba histolytica* from those of *Entamoeba coli*.**—*Jl. Path. & Bact.* 1917. Oct. Vol. 21. No. 4. pp. 511–513.

The authors find that on emulsifying faeces containing amoebae in a stain consisting of 1 in 10,000 neutral red in 0·85 per cent. sodium chloride solution the amoebae will take up the stain if they are *E. histolytica*, but not if they are *E. coli*. Cysts remain unstained.

Where ingested blood cells were present the amoebae containing them always appeared pink. Of thirty cases where *E. histolytica* cysts had been found previously, twelve shewed pink amoebae, associated with *E. histolytica* cysts. In 15 cases in which only pink amoebae were found, *E. histolytica* cysts were found subsequently. In all cases in which *E. coli* cysts were found with active amoebae the latter have remained unstained.

The authors, writing of amoebae which had stained pink and from which stained films (Heidenhain's iron haematoxylin) had been prepared, say "The appearances of the stained amoebae were characteristic of *E. histolytica.*" Later on they state, "Amoebae with pseudopodia and sluggish movements characteristic of *E. coli* have remained quite colourless."

B. B.

CHATTON (Edouard). i. **Réalisation expérimentale chez le cobaye de l'amibiase intestinale à** *Entamoeba dysenteriae.*—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 794–799. With 3 text-figs.

ii. **Les caractères de l'amibiase intestinale du cobaye à** *Entamoeba dysenteriae*: **localisation caecale, absence de dysenterie, importantes réactions hyperplasiques.**—*Ibid.* 1918. Jan. Vol. 11. No. 1. pp. 23–26.

i. The author inoculated 6 guinea-pigs, 3 by ingestion of cysts and 3 by intrarectal injection of dysenteric amoebae. In each group one animal died. "That of the second group" the author says "was infected by the *ingestion* of amoebae from the guinea-pig of the first group, themselves the issue of cysts of human origin." [The italics are the reviewer's. The word should probably be injection, as stated above.] The author considers frankly the possibility of the conditions found at autopsy (one animal died in 20 days, the other in 9) being due to some other agency than the amoeba in question; he concludes however that he has successfully produced amoebic infection of the gut of guinea-pigs by means of human dysenteric amoebae. No dysenteric symptoms were produced.

ii. The first point which is emphasized in this paper is the fact that in the guinea-pig the site of election of the amoeba is the caecum. From this localisation of the amoebic process of tissue invasion the absence of signs of dysentery in the infected guinea-pig can be explained. The chief lesion on which the author lays stress is a hyperplasia of the epithelium of the glands of Lieberkuhn, observable in those regions of the gut wall where necrosis is not too far advanced. This condition results, the author suggests, in this region from an attraction of the amoeba to the mucus, under the influence of which the amoebae pass down the glands to their bases where the mucin cells predominate. It is here that penetration of the muscularis mucosae occurs and this forms the point of entry of the amoeba into the submucosa. The author refers to the observation of HADLEY (this *Bulletin,* Vol. 10, p. 146) on the mode of entry of Trichomonas into the mucous membrane of the caecum of turkeys.

B. B.

Chatton (Edouard). **L'éclosion des kystes et les premiers stades de l'évolution de l'amibe dysentérique humaine chez le chat.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 834–841. With 9 text-figs.

The author made experiments with cats in order to determine the mode, place and time of liberation of the contents of amoebic cysts (*E. histolytica*) when ingested by cats. He gives details of several of his experiments, which resulted in very uniform findings.

His conclusions are:—

1. Morphological.—The cysts traverse the stomach without undergoing modification other than the digestion of the crystalloid bodies. They open in the small intestine by dissolution of their envelope. The amoeba is liberated entire. If it divides this division is late. No indication of it has been observed. The amoeba passes through a stage in which its ectoplasm is finely alveolar when it is very little mobile, to one in which the cytoplasm is vacuolated when amoeboid movement and phagocytic power for bacteria are well developed. The nuclear system presents as its only modification a close approximation of the nuclei beginning from the stage of vacuolization. No indication of the evolution of the 1-nucleated form from the 4-nucleated was obtained.

2. Physiological.—The existence of a stage of bacterial phagocytosis in the cycle of the amoeba of dysentery (which is evidence of the condition through which it has passed in the course of its phyletic evolution before becoming more specifically parasitic) explains how its implantation and increase in a host may be conditioned very strictly by the intestinal flora of the host. The perfect cyst with 4-nuclei and crystalloids is ready to open without a period of maturation. There is no maturation during the sojourn of the cyst outside the body. The only phenomenon apparent, namely the resorption of the crystalloids towards the third day, appears to represent the utilization of a reserve. In material kept without special precautions, cysts have proved able to open at the end of 10 days, which does not appear to be the maximum.

3. Practical.—The immediate maturation of cysts which renders direct contagion possible, their prolonged conservation in dejecta, their carriage by flies, whose intestine they traverse without modification, are reasons for applying rigorously the prophylactic measures laid down by the Sanitary service.

B. B.

Brug (S. L.). **Een paar nieuw ontdekte darmparasieten.** [Two New Intestinal Parasites.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 4. pp. 570–578. With 1 plate.

The author critizes Wenyon and O'Connor who, he says, have called by the name *Entamoeba nana* an amoeba which is more closely related in its nuclear structure to limax than the genus Entamoeba; the name, he suggests should be *Vahlkampfia nana.* He proceeds to describe a small amoeba which he calls *E. minutissima.* The largest are 11 by 6μ or 9 by 8μ, the smallest 4 by 4μ, the usual size being 7 by 6μ and 6·5 by 5μ. The author details the points of distinction between this organism and *Vahlkampfia nana* on the one hand and *E. histolytica* on the other.

The second portion of the paper deals with I. cysts in some detail.

B. B

MERCIER (L.) & MATHIS (C.). **Kystes gamogoniques et schizogoniques chez** *Entamoeba ranarum.*—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 47–54. With 2 plates.

The authors consider that the large cysts of *E. coli* containing more than eight nuclei should be regarded as having a place in the normal cycle of development of *E. coli*, being schizogony cysts. In order to obtain further information on this question they studied the conditions present in the case of *E. ranarum.* A description of the vegetative stage is given and a section on the process of simple division and formation of gamogony cysts containing four nuclei and siderophile inclusions. The size of the cysts is usually 12 to 14μ in fixed and stained preparations, the nuclei measuring 2 to 2·5μ.

The authors confirm the observations of COLLIN (1913) who first described the mode of multiplication by schizogony in *E. ranarum*, which he observed in the tadpole, but not in the frog. The amoebae, measuring from 25 to 40μ, present an amitotic division of the nucleus differing entirely from the mesomitotic division which was found to occur in the development of the gamogonous cysts. The two-nucleated forms resulting from this process proceed to divide further by binary but not always by synchronous division, so that 3 to 8 nucleated forms result, the nuclei being of unequal sizes. Further division of the nuclei of the schizonts proceeds and the number of 20 to 30 or more nuclei may be attained. The schizonts break up into uninucleated schizozoites which grow larger and encyst at a four nucleate or later stage, the cysts measuring from 10 to 18μ in diameter and never containing siderophile inclusions. Variations in the process are described. The conclusion is that in *E. ranarum* as in *E. coli* there occur cysts which arise from multinucleated amoebae. These cysts are characterized by their great variations in size, the number of their nuclei and the absence of siderophile inclusions.

B. B.

OEHLER (Rud.). **Amöbenzucht auf reinem Boden.** [Culture of Amoebae on Pure Media.]—*Arch. f. Protistenk.* 1916. Dec. 27. Vol. 37. No. 2. pp. 175–190. With 1 plate.

Using 5 strains of Amoeba the author has observed their development in culture with various bacteria, and finds that on the whole little morphological modification can be traced in them which can be attributed to their being cultivated with bacteria. Great difference in success of amoebic growth was observed with different pure cultures of bacteria. This the author attributes to the absence or presence of chemical products of the bacteria on various media. *B. prodigiosus* grown on broth-agar is an unfavourable medium for the growth of amoebae on account of the production of Trimethylamine. In the case of *B. subtilis* the amoebic culture was obtained by growing the bacteria on a 1-2 per cent. water agar plate, and once obtained was easily carried on. Gram negative bacteria on plates proved more efficient in media than Gram positive. All the amoebae studied migrated over the plates to a greater or less extent and the author uses this degree of wandering as a diagnostic point. A comparison between young and old bacteria gave indications that young bacteria afford in many cases a better medium for amoebic culture.

Non-bacterial nutriment such as drops of oil, red blood cells, fibrin threads and starch granules were not taken up by the amoebae.

A strain of small amoebae was grown on a *B. coli* plate and quickly grew over it. Large amoebae-Amoeba I.—*Hartmannella aquarum* or *Vahlkampfia magna*, were then inoculated on the plates and all behaved in exactly the same manner, growing rapidly at the expense of the small amoebae. These were taken up by the large amoebae and appeared on a first glance like nuclei of the larger amoebae. An amoeba of swine did not ingest the small amoebae.

The author was successful in growing amoebae on killed bacteria which were smeared on plates. *Hartmannella aquarum* and *Vahlkampfia magna* grew on *B. coli.*, sarcina or yeast autoclaved at 130° for 1 hour. He refers to the work of the Japanese TSUJITANI and confirms it. Amoebae which grow on live bacteria can be grown on them when the bacteria have been killed by various methods and can then be carried on in culture free from contamination. Experiments were made to determine whether the amoebae took up as nourishment fluid egg albumen, peptone and sugar. The result showed that these did not constitute a food sufficient for amoebae. In one of the amoebae cultured—that from the swine—it was found that grape sugar added to the *B. coli* agar on which the amoebae were growing caused the appearence of enormous multinucleated forms. From 2 to 20 nuclei could be found in such a cell, the cell being rounded and 50 to 150μ in size.

B. B.

ABRIOL (Rufino). **Amoebic Abscess of the Liver among Filipinos.**—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. May. Vol. 12. No. 3. pp. 121–147.

This is a thesis written for degree purposes and contains a considerable amount of original work together with observations made by previous workers. The conclusions are :—

"1. Seventy-nine per cent. of liver abscess cases among Filipinos as seen at the Philippine General Hospital are distinctly associated with intestinal amoebiasis.

"2. Liver abscess is relatively frequent among Filipinos.

"3. There is apparent predominance of cases of liver abscess among Filipinos during the cool and rainy months.

"4. The age incidence corresponds with that of other countries.

"5. Filipino women are not as immune to the disease as European or American women.

"6. Occupation plays an important role in the etiology of liver abscess, as in certain occupations the individuals are brought to a condition or position favourable to infection.

"7. The right lobe is the most frequent site of the abscess in our cases among Filipinos.

"8. Fever is not typical in cases of amoebic abscess of the liver.

"9. There is nothing characteristic in the pain symptoms.

"10. The blood picture varies—being normal in many cases. In the majority of the cases, the polynuclear count is normal. There is no eosinophilia in our cases, nor is there any increase in the mononuclears.

"11. Diagnosis is easy in advanced cases, but extremely difficult in early cases with small abscesses.

"12. Intestinal haemorrhage as a complication of liver abscess is not necessarily fatal.

"13. Mortality among Filipino cases is relatively low, in spite of the fact that they come very late for treatment."

B. B.

LOEW (Johann). **Das Vorkommen der Amöbenenteritis im Küstengebiete der Adria.** [Amoebic Dysentery on the Adrian Coast.]—*Wien. Med. Woch.* 1917. Feb. 24. Vol. 67. No. 9. pp. 452–453.

The author considers it possible that infections with amoebae causing dysentery may occur in temperate climates, but it is unlikely that great epidemics will occur as the conditions for spread are not favourable. He describes two cases of his own and refers to RIEGEL'S cases. Speaking of the vegetative stage of the amoebae of dysentery, he says "its appearance when full grown is so characteristic that a mistake is hardly possible."

B. B.

VICKERY (E. A.) & MCMULLIN (J. J. A.). **Amoebiasis with Constipation.**—*U. S. Nav. Med. Bull.* 1917. Oct. Vol. 11. No. 4. pp. 540–541.

The authors give a short account of two cases of marked and obstinate constipation in cyst carriers, one with a history of an acute attack of dysentery one year previously, the other with no such history. They consider that such cases might easily be mistaken for chronic intestinal obstruction. [No evidence is given to shew that the amoebic condition was responsible for the symptoms in these two cases.]

B. B.

i. CHATTON (Edouard). **Au sujet des Cristalloïdes (Chromidium, corps chromatoïdes, bâtonnets ou plages sidérophiles) des kystes d'Entamibes.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 791–794.

ii. MATHIS (C.) & MERCIER (L.). **A propos du soi-disant chromidium des kystes des entamibes.**—*Ibid.* Dec. No. 10. pp. 866–868.

i. This is a criticism of the views expressed by MATHIS and MERCIER as to the significance and origin of the inclusions in cysts of amoebae, variously termed chromidia, siderophile bodies and crystalloid bodies [see this *Bulletin*, Vol. 11, p. 53]. The author denies the possibility of differentiating between the bodies as found in *E. histolytica* cysts and *E. coli* cysts and considers that in neither case are they of nuclear origin, but on the contrary that in both cases they are derived from the protoplasm and are perivacuolic. He states that his views have now been adopted by MATHIS and MERCIER apparently as a discovery of their own, and that the new terms applied by them are merely confusing.

ii. A reply to CHATTON'S article. The authors admit that the question is not of vital importance but reply in order to shew that CHATTON is by no means misrepresented by them. This they do by quotation from his and their works.

B. B.

BACILLARY DYSENTERY.

MAER (C. Muriel Astley). **A Case of Septicaemia due to Infection by *Bacillus dysenteriae* Shiga.**—*Brit. Med. Jl.* 1918. Jan. 19. p. 84.

The author records a fulminating case of dysentery with a fatal issue from toxaemia, in which the temperature never rose above 100·2°, marked cerebral symptoms were present, but abdominal pain, tenderness, straining and tenesmus were absent. Neither amoebae nor dysentery bacilli were found in the stools. Blood culture yielded a profuse pure growth of Shiga's bacillus. Post mortem examination showed the whole mucous membrane of the large intestine to be intensely congested and studded throughout with minute superficial ulcers. Shiga's bacillus was isolated from scrapings of the mucous membrane of the lower bowel.

F. E. Taylor.

FLETCHER (A. A.). **Notes on the Treatment of Bacillary Dysentery.**—*Canadian Med. Assoc. Jl.* 1917. Dec. Vol. 7. No. 12. pp. 1094–1096.

These observations were made during an outbreak of dysentery among the Salonika Forces in the summer of 1916. Of 98 cases examined bacilli of the Shiga type were found in 78, whilst the other 20 belonged to the Flexner group.

Good results were obtained by fluid diet, salines, colonic lavage and serum. The Polyvalent antidysenteric serum of the Lister Institute was given to all the cases. In severe cases 80–100 cc. was given intravenously the first day in a single or divided dose, 60 cc. on the second and when necessary a further 60 cc. on the third day. Further administration of serum did not seem to influence the course of the disease even where blood and mucus were still present in the stools. The Flexner dysenteries were often mild and cleared up well without serum. The severe ones did not react as favourably to serum treatment as those infected with the Shiga bacillus.

F. E. T.

DUFOURT (P.) & DEVIC (A.). **Du traitement de la dysenterie bacillaire aigue.**—*Lyon Méd.* 1917. Dec. Year 49. Vol 126. No. 12. pp. 541–552.

The authors consider that in serum therapy we possess a treatment with almost absolute efficacy against acute bacillary dysentery. This treatment should be commenced at the beginning of the disease and large and repeated doses of the serum should be given. The dysenteric syndrome improves rapidly and a short and favourable convalescence ensues. Where the serum is ineffective abnormal forms are present, such as are associated with amoebae or aberrant bacilli. The fear of serum reactions which are more or less frequent, and of anaphylactic accidents which are exceptional, are never contra-indications against serum therapy. These reactions and accidents are in all cases absolutely independent of the dose of serum injected. Dysenteric arthritis should not be wrongly diagnosed. Medication accessory to serum therapy, such as saline injections and adrenaline, is of real value. Dehydration and denutrition must be contended with. Lastly prophylactic treatment—disinfection, washing the hands, etc.—should not be overlooked.

F. E. T.

FIGUEIRA (Luis). **Um caso de disenteria. Isolamento de um bacilo do tipo Shiga.** [A Case of Dysentery of the Shiga Type.]—*Med. Contemporanea.* 1917. Dec. 23. Vol. 35. No. 50. pp. 393–397.

A University thesis containing a study of the bacillus isolated from a case of dysentery. No particulars are given of the case, which is stated to have been the first in Portugal in which a dysentery bacillus has been isolated. The organism was taken through the sugars and otherwise examined in the laboratory, and gave identical results with two strains of the Shiga bacillus, one of which was obtained from London and the other from Prague. It agglutinated up to 1 in 1,000 with a Shiga serum obtained from Berne.

J. B. Nias.

MIDA (M.). [**A Dysentery-Like Organism called "Fukuoka Paradysentery A and B" isolated from Certain Cases of Dysentery in Infants.**]—*Saikingaku Zasshi* (*Jl. Bacteriol.*). 1917. Mar. 15. No. 258. pp. 173–237.

[From Review by R. G. MILLS.]

The author has treated 21 cases—dysentery in children in whom the causal organism has been isolated and found to be practically identical. The bacilli could be plated out from the faeces as late as 13–16 days after the onset and were often as numerous on an Endo plate as the colon bacilli. The pathogenicity of the organism was assumed on the basis of the agglutination reactions and the pathogenicity for animals wherein it closely resembled the dysentery bacilli. The reactions were:—

X bacilli—homologous serum (patients serum) 7th-8th day, 1–80 or 1–100; in 2–3 weeks, 1–300 or 1–500, rarely 1–1,000.

X bacilli—heterologous serum (another patient's serum), same.
X bacilli—dysentery serum, 1–20, rarely 0.
X serum—dysentery bacilli, 1–20. rarely 0.
X serum—*B. coli*, 1–10, 1–20, or 0.
X bacilli—typhoid serum, 0.
X bacilli—paratyphoid serum, 0.
X bacilli—normal serum, 0.

Unusual phenomenon.—It was stated that X bacilli could restrain the agglutination of other forms in the lower dilutions of serum, but was unable to do so when more dilute.

Complement fixation.—The antigen for this and other related organisms was prepared by suspending the bacteria in distilled water, heating to 60° C. for 15–20 hours, agitating for 48 hours, centrifuging and preserving the supernatant liquid. This was diluted to 5 per cent. for use. The complement was 2 per cent. guinea-pig blood and the serum was inactivated for 30 minutes at 58° C. Results.—Both strains were found to bind complement interchangeably, no action was noted with the use of a dysentery antigen prepared with the different strains and none with these sera and x antigen.

Morphological characters.—The size is slightly larger than that of the dysentery bacillus, the ends are rounded, and they usually occur singly, rarely in strings. They are non-motile and stain readily with the ordinary aniline dyes and Giemsa, often showing a decided bipolar tendency.

Culturally the growth on potato is denser than that produced by the Shiga bacillus and less than formed by *B. coli*. The form of the colonies on the agar plate is thought to be characteristic in its pleomorphism. The usual form is circular or semicircular but a certain proportion of the colonies are U shaped. This unusual shape is more noticeable in those which have been subcultured several times than on the first plating from the faeces. The organism grows readily at room or incubator temperature in weak alkaline solutions. In gelatin and 5 per cent. dextrose agar stabs the growth is good but without the formation of gas. In peptone solution there is medium cloudiness and no pellicle. Indol is produced in 5 days in a 1 per cent. solution. Milk is coagulated after 1–2 weeks the process beginning at the bottom of the tube and extending gradually upward. In litmus media there is an initial redness the first day which turns to blue for 2–3 days and then back to red again. Acid but no gas is produced from dextrose, maltose, saccharose lactose and dextrin.

Animal inoculation.—Living as well as dead cultures of X are quite toxic to rabbits and guinea-pigs, especially young ones. Successful passage however increases the toxicity somewhat, the organisms reaching the intestine after a subcutaneous injection and the bacteria being recoverable from any of the internal organs after death.

Clinically the cases were indistinguishable from the ordinary form of dysentery. Autopsy on 5 of the 21 cases that died gave noticeable changes in the intestines, following swelling with superficial erosion, and great oedema and hyperemia of the entire colon. In a few places there was a tendency to pseudomembrane formation. The faeces were full of purulent bloody mucus. Three photographs of colonies and agar plates illustrate the shape of the growth; a drawing of a cross section of the intestines shows the formation of the pseudomembrane, and a fifth plate delineates the arrangement of the fibrin threads in the exudate in the colon.

F. E. T.

LEVI DELLA VIDA (Mario). **Alcune osservazioni sulla dissenteria bacillare nelle popolazioni del Bellunese e Trevigiano.** [Some Observations on Bacillary Dysentery in the Population of the Provinces of Belluno and Treviso].—*Giorn. di Med. Milit.* 1917. Dec. 31. Vol. 65. No. 12. pp. 1018–1026.

Bacillary dysentery has increased since 1912 in the provinces of Belluno and Treviso in Northern Italy, where it occurs both sporadically and as small epidemics. Using Endo and Drigalski (with and without crystal violet) for plating the stools the only dysentery bacillus that the author has succeeded in isolating is the Shiga-Kruse bacillus, the only other organisms obtained being *B. coli communis* and *communior* and various non-lactose fermenters, such as the *B. metacoli* or *paracoli* of Jensen and Bahr, various types of B. Morgan, etc.

F. E. T.

HUNZIKER. **Ueber bazilläre Ruhr.** [On Bacillary Dysentery.]—*Correspondenz-Blatt f. Schweizer Aerzte.* 1917. Sept. 22. Vol. 47. No. 38. pp. 1226–1232.

In recent decades Switzerland has been free from dysentery but in August 1917 it was made a notifiable disease throughout the whole country, on account of the danger of its introduction from the combatant troops and civil population of neighbouring countries. An instance of this occurred in September 1916. An old lady of 64, coming from abroad, visited her interned son in a prisoner-of-war camp in the Bernese Oberland after a five days journey. On the night of her arrival a severe attack of dysentery commenced, ending fatally in ten days. Dysentery bacillus Y was isolated from the stools shortly before death. The attendant physician, nurse and son of the patient were all infected but recovered and from the stools of two of them Flexner's bacillus and the Y bacillus were isolated.

An account is then given of the course, diagnosis, progress, treatment and prophylaxis of dysentery to supplement the text book descriptions which constitute the only knowledge of the disease possessed by the majority of Swiss physicians.

F. E. T.

VON FRIEDRICH (Ladislaus). **Zur Epidemiologie der Shiga-Kruse-Dysenterie.**—*Deut. Med. Woch.* 1917. Dec. 20. Vol. 43. No. 51. pp. 1585-1587. With 3 charts.

The author records a small epidemic of dysentery in the soldiers of a fortress, the disease being introduced by the cook, who while purchasing foodstuffs came in contact with the civil population amongst whom sporadic cases of dysentery had occurred. Either by bacteriological examination of the stools or by agglutination the outbreak was shown to be due to the Shiga-Kruse bacillus. The symptoms were not severe and no deaths occurred. Recurrences in which the symptoms were less severe than the original attack were observed in five cases.

F. E. T.

i. UMBER. **Krankheitsbild und Behandlung der Ruhr im Heimatgebiet. I. Klinischer Teil.** [Clinical Picture and Treatment of Dysentery in Germany.]—*Deut. Med. Woch.* 1917. Dec. 6. Vol. 43. No. 49. pp. 1521–1524.

ii. FRIEDEMANN (U.). **II. Bakteriologie der Ruhr.** [Bacteriology of Dysentery].—*Ibid.* pp. 1524–1525.

i. Dysentery, usually of the milder type, has made its appearance during the summer in Berlin and northern Germany. The complications and sequelae which have been observed include toxic disturbances of the heart muscle and of the vessels, leading to oedema, rheumatoid diseases, which occurred in the second week of the disease in 2–7 per cent. of the cases, conjunctivitis, according to STARCK the commonest of the complications, the less frequent keratitis and irido-cyclitis, toxic neuritic disorders of the nervous system and achylia. The various remedies for dysentery are critically considered, and the author is sceptical as to the value of the serum treatment, and states that in six different factories in Germany no less than 13 different anti-dysenteric sera are prepared.

ii. In the hands of Friedemann examination of the stools for dysentery bacilli has given disappointing results. By obtaining mucus direct from the sigmoid flexure by means of the proctoscope and plating direct on plain agar instead of on Conradi-Drigalski agar, with or without crystal violet, Friedemann has obtained the Shiga bacillus in every one of a series of 16 cases. From his bacteriological and serological experiences the author is convinced that the cause of epidemic haemorrhagic colitis is to be exclusively found amongst the recognised dysentery bacilli.

The course and mortality were compared in 100 cases treated by a polyvalent Shiga serum in doses of 80 to 200 cc. intravenously and intramuscularly, and 95 equally severe cases untreated with serum as controls. Statistically no proof of the value of the serum could be obtained either in lessening the mortality or in diminishing the duration of the disease. F. E. T.

BENEKE (R.). **Zur Pathogenese, Behandlung und Prophylaxe der epidemischen Ruhr.** [The Pathogenesis, Treatment and Prophylaxis of Epidemic Dysentery.]—*Münch. Med. Woch.* 1917. Sept. 25. Vol. 64. No. 39. pp. 1277–1278.

The author rejects the commonly accepted opinion, that the mouth is the usual portal of entry of the infecting organism in epidemic dysentery, by means of infected food, water, etc. He points out that dysentery bacilli are extremely sensitive to acid and would ordinarily be killed by the acid gastric juice unless pathological conditions were present diminishing the acidity of the gastric juice, such as gastric catarrh, or the bacilli were present in enormous numbers as to pass through the stomach undamaged. Beneke advocates the view that the invasion of the large intestine by dysentery bacillus is via the anus. He considers that a consideration both of the pathologico-anatomical and the clinical facts supports this view and that the disease begins in the rectum and gradually ascends as an ascending colitis to the caecum.

The anus may be directly infected by contact with the fingers, toilet paper, etc., or the bacilli may exist for long periods in the moist skin of the perineal cleft and so infect the anus.

In the treatment of the disease early topical applications should be applied to the rectal mucous membrane, and as a prophylactic measure the bacilli living on the moist skin of the perineal cleft should be destroyed by suitable antiseptic procedures. F. E. T.

SCHMITZ (K. E. F.). i. **Ueber einen bisher noch nicht bekannten Krankheitserreger aus der Dysenteriegruppe.** [A hitherto Unknown Disease-Producer in the Dysentery Group.]—*Münch. Med. Woch.* 1917. Dec. 4. Vol. 64. No. 49. pp. 1571–1572.

ii. **Ein neuer Typus aus der Gruppe der Ruhrbazillen als Erreger einer grösseren Epidemie.** [A New Type of Dysentery Bacillus as the Cause of a Large Epidemic.]—*Ztschr. f. Hyg. u. Infektionskr.* 1917. Dec. 9. Vol. 84. No. 3. pp. 449–516. With 2 plates.

In a large camp containing many thousands of prisoners an epidemic of dysentery occurred in January-February 1917 in which 10 per cent. of the prisoners were attacked. The epidemic was of a mild character. An organism was isolated and held responsible for the disease which presented characters different from all the known members of the dysentery group.

Culturally it differed from the pseudo-dysentery group in fermenting mannite and from the Shiga-Kruse bacillus in the abundant formation of indol. Serologically, the new bacillus was not agglutinated by high titre dysentery sera and the serum obtained after injection with this organism. although powerfully agglutinating the new bacillus, only agglutinated the other dysentery bacilli in very low titre. Further the independent position of the new bacillus was proved by the results of Castellani's saturation test.

The new bacillus, to which Abel has given the name of the bacillus Schmitz, must be considered to be the causal agent of the epidemic since it was only found in the typical stools and also agglutinated the serum of patients in high dilution. That the bacillus Schmitz belonged to the group of dysentery bacilli was proved by the character of the epidemic, the co-agglutination with Shiga-Kruse, the absence of flagella and motility, and by the typical dysentery smell of the cultures. The bacillus Schmitz occupies a mid-position between the recognised groups of dysentery bacilli, and belongs to a new group further members of which will probably be brought to light in the future

F. E. T.

Přibram (Ernst). **Ueber Dysenterietoxin und Dysenterieantitoxin. I. Ein bisher unbekanntes Dysenterietoxin in den mannitvergärenden Stämmen A-H von Kruse.** [Dysentery Toxin and Dysentery Antitoxin. I. A Hitherto Unknown Dysentery Toxin in Kruse's Mannitefermenting Strains A–H.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. Aug. 30. Vol. 80. No. 1–3. pp. 33–40.

Přibram found that bouillon culture filtrates of the mannite-fermenting strains of dysentery bacilli were strongly toxic to goats in intravenous injection, less so to rats in intraperitoneal injection, but were non-toxic to guinea-pigs either by intravenous or intraperitoneal injection. The toxicity of these filtrates appeared to be parallel to that of the cultures themselves. It was best obtained in broth containing 6 cc. of N-soda solution after neutralisation to litmus.

By injecting increasing doses of the toxin an antitoxin could be produced which completely protected against intravenous injection of the toxin. The antitoxin obtained by injecting the Shiga-Kruse toxin was ineffective against one of Kruse's D strains.

F. E. T.

Martin (C. J.) & Williams (F. E.). **Types of Dysentery Bacilli isolated at No. 3 Australian General Hospital, Cairo, March-August, 1916, with Observations on the Variability of the Mannite Fermenting Group.**—*Jl. of Hygiene.* 1917. Dec. Vol. 16. No. 3. pp. 257–268.

Attempts to isolate dysentery bacilli from 217 cases occurring amongst Australian troops of the E. E. F. in which the stools contained muco-pus with or without blood yielded the following results:—

Amoeba histolytica or cysts present	63
B. dysenteriae Shiga isolated	47
Mannite fermenting (agglutinated at time of isolation by Y serum)	64
Dysentery bacilli (not agglutinated at time of isolation by Y serum)	12
No causative organism recovered	36
Total	222

In five instances dysentery bacilli were isolated from patients with amoebic infections.

The biochemical activities of forty-nine strains of the mannite fermenters were investigated immediately after isolation and again six months later. They showed variability as regards the fermentation of maltose, saccharose, dextrin, arabinose, isodulcite, sorbite and glycerin and in the formation of indol. The same strain varied at different times, some gaining, others losing one or other of these properties.

The authors consider that the separation of the mannite fermenting dysentery bacilli into groups on the ground of their action on the above carbohydrates is unsound and that the only carbohydrates of service for their identification are glucose, mannite, lactose, and dulcite. In one strain the fermentation of saccharose was found to be a " recessive character " and only maintained by artificial selection. One sixth of the mannite fermenting dysentery bacilli isolated were not agglutinated by a univalent Y serum at the time of isolation, but half of these acquired this property by cultivation. In one strain agglutinability to Y serum was lost under prolonged cultivation on saccharose peptone media, and was rapidly regained by propagation in broth.

The authors conclude that no one univalent serum will agglutinate all dysentery bacilli of the mannite fermenting type and that a bacillus with the morphological, cultural and biochemical characters of dysentery bacilli of this type is not discredited as an etiological factor because it is not agglutinated by any particular univalent serum.

F. E. T.

D'HÉRELLE (F.). **Sur un microbe invisible antagoniste des bacilles dysentériques.**—*C. R. Acad. Sci.* 1917. Sept. 10. p. 373.

From the stools, and in one case the urine, of convalescents from bacillary dysentery the author claims to have obtained growths of an ultra-microscopic organism which passes through a Chamberland L2 filter, and destroys the Shiga bacillus by lysis. This anti-Shiga microbe possesses no pathogenic action for experimental animals, but will immunise the rabbit against a fatal dose of Shiga's bacillus.

d'Herelle considers this organism to be a veritable microbe of immunity, an obligate bacteriophage, with strictly specific parasitism. He believes that the production of a heterologous anti-microbic immunity by an ultra-microscopic antagonistic micro-organism may not be confined to dysentery, but may be a more general phenomenon as he has also observed a similar, though less marked condition in two cases of para-typhoid fever.

F. E. T.

BEINTKER. **Ueber Paragglutination bei Ruhr.** [Para-Agglutination in Dysentery.]—*Deut. Med. Woch.* 1917. Nov. 15. Vol. 43. No. 46. pp. 1446–1447.

The author reports a case of dysentery in which an organism was recovered from the stools which gave the cultural characters of

B. paratyphosus B, but agglutinated dysentery Y serum, but not that of *B. paratyphosus* B or any other member of the typhoid-coli group; thus:—

Serum dilution	Typhosus 1/1000	Para-typhosus A 1/1000	Para-typhosus B 1/1000	Shiga 1/500	Y 1/1000	Gartner 1/1000
No. 769	—	—	—	—	++	—

F. E. T.

HOLLANDE (A. Ch.) & FUMEY (M.). **Emploi de l'ovalbuminate de soude et des papiers réactifs tournesolés sucrés dans la différenciation des bacilles dysentériques: gélification de l'alcali-albumine.**—*C. R. Soc. Biol.* 1917. Nov. 10. Vol. 80. No. 17. pp. 835–839.

The authors employ for the differentiation of dysentery bacilli an aqueous solution of ovalbuminate of soda to which is added the selected sugar, litmus being employed in the form of litmus papers. Saccharose, glucose, lactose, mannite and maltose suffice for the differentiation of the dysentery bacilli; and the fermentation reactions may be arranged in tabular form, thus:—

	Glucose	Mannite	Saccharose	Maltose	Lactose
Shiga	A	—	—	—	—
Hiss	A	A	—	—	—
Strong	A	A	A	—	—
Flexner ..	A	A	A	A	—

The reactions of the fermented sugars are shown by change in colour of the litmus paper, coagulation of the medium and by decolorisation of the liquid due to the production of a leucoderivative of the litmus.

F. E. T.

MICHAELIS (L.). **Ueber kombinierte Eiweiss-Säureagglutination, insbesondere zur Unterscheidung von Koli- und Ruhrbazillen.** [Combined Albumen-Acid-Agglutination, with Reference to the Differentiation of Colon and Dysentery Bacilli.]—*Deut. Med. Woch.* 1917. Nov. 29. Vol. 43. No. 48. pp. 1506–1507.

Michaelis has previously described the acid agglutination of typhoid and paratyphoid bacilli, each organism possessing its own acid agglutination optimum. Colon and dysentery bacilli show no acid agglutination. On the addition of even a trace of any albuminous substance, for example a small quantity of strongly diluted blood serum, the phenomenon of acid agglutination is shown by the colon bacillus, but not by dysentery bacilli. Michaelis considers it probable that a positive albumen-acid-agglutination is a group reaction for colon bacilli and that a negative albumen-acid-agglutination is a group reaction for dysentery bacilli.

F. E. T.

NOWICKI (Witold). **Ueber das kombinierte Verfahren bei der Untersuchung der Typhus-, Paratyphus- und Ruhrstühle.** [On the Combined Procedure in the Examination of Typhoid, Paratyphoid and Dysentery Stools.]—*Wien. Klin. Woch.* 1917. Sept. 20 & 27. Vol. 30. Nos. 38 & 39. pp. 1204–1206 ; 1240–1244.

The author points out the unsatisfactory results usually obtained in the examination of typhoid, paratyphoid and dysentery stools, both by direct plating and by the use of indirect methods. He considers that methods of enrichment are preferable to methods of inhibition, especially in the examination of typhoid stools. The best results are obtained by a combination of direct plating with indirect methods. For typhoid and paratyphoid direct plating combined with the use of bile media is best, a combination with the pretoleum ether method being unsatisfactory. The petroleum ether method is quite unsuitable for dysentery stools, in which a combination of direct plating with the normal saline method, allowing an exposure of six hours, gives the best results. Hence in examination of the stools for all three organisms direct plating combined with bile media and the normal saline method should be employed. F. E. T.

GASSNER-Rostock (G.). i. **Metachromgelb als Hemmungsmittel für Kokken und Sporenbildner und seine Verwendbarkeit für Nährböden zur Typhus-Ruhrdiagnose.** [Metachrome Yellow as Inhibitor of Cocci and Spore-Formers and its Applicability in the Diagnosis of Typhoid and Dysentery.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. Aug. 30. Vol. 80. No. 1–3. pp. 120–127.

ii. **Ein neuer Dreifarbennährboden zur Typhus-Ruhr-Diagnose.** [A New Three Colour Culture Medium for the Diagnosis of Typhoid and Dysentery.]—*Ibid.* Nov. 15. No. 4. pp. 219–222.

i. Gassner found that the addition of 0·1 per cent. of metachrome yellow II R D to feebly alkaline culture media completely inhibited the growth of cocci and spore-forming bacilli, but had no influence on the growth of typhoid and dysentery bacilli or on the agglutinability of these organisms.

ii. He recommends the addition of 125 cc. of 2 per cent. metachrome yellow solution and 175 cc. of 1 per cent. water-blue solution plus 100 gm. lactose to 2 litres of feebly alkaline yeast water or agar for the examination of stools for typhoid and dysentery bacilli. The medium is green, prevents the growth of cocci and spore-bearing bacilli, and has no influence on the growth of typhoid and dysentery bacilli or on their agglutinability. Coli colonies are opaque and have a blue surround, typhoid and dysentery bacilli are translucent and have a yellow surround. These colour changes are equally visible by transmitted and reflected light and by natural and artificial light.

F. E. T.

VON DARÁNYI (Julius) & STRANSKY (Eugen). **Beobachtungen über Schutzimpfung bei Ruhr.** [Observations on Protective Inoculation in Dysentery.]—*Wien. Klin. Woch.* 1917. Nov. 8. Vol. 30. No. 45. pp. 1424–1425. With 1 chart.

An epidemic of dysentery occurred in July-August 1917 in the military prison at Arad [Hungary]. The whole of the prisoners—

about 800 in number—were then given two injections of 1 cc. of a Shiga-Kruse vaccine at five days interval. Although the mortality for the whole epidemic was 14·5 per cent. in spite of intensive serum treatment, no further fatal case occurred after the inoculations were given and in four days time (three days being allowed as the incubation period of dysentery) the epidemic was brought to an end.

F. E. T.

FICKLER (Alfred). **Ruhrschutzimpfungen mit dem Impfstoff von Ditthorn und Loewenthal.** [Protective Inoculation with the Vaccine of D. & L.]—*Münch. Med. Woch.* 1917. Dec. 11. Vol. 64. No. 50. pp. 1600–1601.

As the result of injecting 800 persons the author considers that protective inoculations with the vaccine of DITTHORN and LOEWENTHAL [see this *Bulletin*, Vol. 11, p. 59] are free from danger. Local reactions are trivial, a rise of temperature occurring in 20–25 per cent. of the cases inoculated. Protection against dysentery is secured which lasts more than two months.

F. E. T.

MIXED AND UNCLASSED DYSENTERY.

HURST (A. F.). **Dysentery; Clinical Lecture.**—*Guy's Hosp. Gaz.* 1917. June 30 & July 14. Vol. 31. Nos. 756 & 757. pp. 243–249; 261–266.

The first lecture deals with amoebic dysentery, WENYON's description of the *Entamoeba histolytica* being closely followed and his opinion that flies are the most important means of spreading the disease being given. Hurst considers that the stools of convalescent and contact carriers are a more fertile source of infection than those of patients suffering from dysentery. As regards treatment, gr. 1 of emetine hydrochloride should be injected subcutaneously once daily for twelve days. In very severe cases gr. ½ to 1 dissolved in 5 cc. of normal saline solution should be injected intravenously and in less severe cases gr. 1 can be given subcutaneously as long as may be necessary, but there should be an interval of a few days after each period of twelve days. If any blood or mucus reappears in the stools gr. 1 of emetine hydrochloride should be injected every night for six nights. Since the treatment has become so much more effective as a result of using emetine subcutaneously Hurst considers that neither appendicostomy nor any other operation ought ever to be necessary.

The second lecture deals with bacillary dysentery. The dysentery which has always been common among armies during war time was most probably bacillary and not amoebic. The bacillary dysentery in the Mediterranean Forces and on the Eastern Front was chiefly caused by Shiga's bacillus, and that on the Western Front by Flexner's and the Y bacillus, although in the summer of 1916 isolated outbreaks of Shiga infection were recorded, probably as a result of infection brought by troops who had previously fought at Gallipoli.

In fulminant cases the suprarenal glands show congestion and necrosis, and death may endure from suprarenal insufficiency. Arthritis involving one or more of the large joints, whilst common in the British troops in the South African war, has been comparatively rare in the present war. The knee is most often affected, there being much effusion which does not suppurate, the disease bearing some resemblance to gonococcal arthritis.

The specific treatment of bacillary dysentery consists of anti-dysenteric serum administered intravenously. from 40 to 100 cc., depending on the severity of the case, and the dose may be repeated daily for ten or more days if necessary. Saline aperients are of value only in bacillary dysentery. Unless the patient is seen on the first day when the initial dose should be omitted, ½ oz. of sodium sulphate in saturated solution should be given at the outset, followed by drachm doses every four hours during the first day and then every six hours until the dysenteric character of the stools disappears. The local treatment consists of enemata of tannic acid (gr. 4 to the ounce), one and a half pints of fluid at 100° F. being slowly run into the rectum. The enemata should be repeated daily or on alternate days between three and five times and the series can, if necessary, be repeated after a week's interval. A persistent infection with *B. dysenteriae* or *B. paratyphosus* should be treated by autogenous vaccines.

F. E. T.

KRUSE. **Ueber die Veränderlichkeit der Seuchen, insbesondere des Typhus und der Ruhr.** [The Variability of Epidemic Diseases, especially Typhoid and Dysentery.]—*Münch. Med. Woch.* 1917. Oct. 2. Vol. 64. No. 40. pp. 1309–1311.

The author discusses the question as to whether epidemic diseases have undergone any change in character during the course of time and points out how the war has provided many examples of this change. He contrasts the small epidemic of small-pox which occurred in Germany last year, with the great outbreak of this disease during the war of 1870 to 1871 and with its characters and prevalence in pre-Jennerian times. Typhoid as well as paratyphoid fever has also been modified by the adoption of prophylactic vaccination in the army. Dysentery has also been differentiated in recent years into the two forms amoebic and bacillary, the latter being due to true dysentery bacilli and to the so-called pseudo-dysentery bacilli. Before the war Kruse had differentiated the so-called pseudo-dysentery bacilli into various strains or types, naming them A to H, and during the war two further strains named I and J have been encountered. Lastly he discusses the question of the "Mutation" of bacilli, especially of coli and dysentery bacilli. Laboratory strains kept for many years have shown variations in agglutinability, in power to ferment mannite and maltose, and in virulence, but the change of dysentery to pseudo-dysentery bacilli, or change of one strain of the latter to another has never been observed.

F. E. T.

UMNUS (O.). **Ruhr und ruhrähnliche Erkrankungen.** [Dysentery and Dysentery-Like Diseases.] — *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1. Teil. Orig. 1917. Vol. 26. No. 1. pp. 83–96.

Umnus thus classifies cases of infective colitis :—

Disease.	Cause.
1. Dysentery	*B. dysenteriae*, Shiga-Kruse
2 Paradysentery	(a) 1. Type Y.
	2. ,, Flexner
	3. ,, Strong
	4. ,, Aronson, etc.
	(b) Strains A-H Kruse
3. Colitis haemorrhagica	Without specific cause

In the recognition of the causal organism it is necessary to investigate all its characters—biological (cultural and serological) and morphological, its virulence, motility and staining powers. Agglutination is not sufficient for diagnosis, as the occurrence of co- and para-agglutination may lead to error. The Widal reaction gives better results in dysentery than in para-dysentery. The use of serum is not recommended, which is not surprising seeing that it was only given in doses of 10 to 20 cc. subcutaneously.

F. E. T.

HEINRICHSDORFF. **Bemerkungen über Ruhr.** [Remarks on Dysentery.] —*Med. Klinik.* 1917. Mar. 4. Vol. 13. No. 9. pp. 242–243.

This paper records the author's personal impressions of dysentery in a field hospital on the Eastern Front. A sudden onset with rigors, headache and vomiting was observed in many cases. The temperature chart was not characteristic—irregular remittent pyrexia being most commonly observed. In many cases the strongly remitting pyaemic form of temperature chart was seen. Although the intestinal symptoms dominated the clinical picture in the majority of the cases, in some the signs of general toxaemia predominated. Damage to the renal epithelium by the toxin produced albuminuria with hyaline and granular casts in the urine, seldom red blood corpuscles. The toxin acting on the liver produced jaundice, and on the spleen enlargement of that organ. An urticarialike erythema, herpes labialis, petechiae, hiccough, laryngeal paralysis, bradycardia and arthritis were all observed. The mortality was 2 per cent. Positive agglutination was obtained in 80 per cent. of the cases, most frequently with Flexner's bacillus, almost as frequently with the Y bacillus, least frequently with Shiga's bacillus. The agglutination titre was extremely variable, more than one organism being usually agglutinated by the same serum. The Flexner and Y bacilli were most frequently agglutinated together. In many cases the agglutination was alternately positive and negative in the same patient at different times.

Anatomically the disease appears to commence in the large bowel as a haemorrhagic inflammation (Colitis haemorrhagica). The mucous membrane becomes necrotic (Colitis necroticans), separated (Colitis pseudo-membranacea) and finally cast off (Colitis ulcerosa). In other cases it appears to be a Colitis fibrinosa.

Death in the acute stage results from toxaemia, in the subacute and chronic from anaemia, inanition and diffuse peritonitis.

F. E. T.

GASBARRINI (Antonio). **Sull' etiologia di alcune diarree dissenteriformi fra le truppe combattenti.** [Dysenteric Types of Diarrhoea among Italian Troops.]—*Policlinico.* Sez. Med. 1917. Nov. 1. Vol. 24. No. 11. pp. 429–441. With 1 text-fig.

The author has been able to identify three types of dysenteric diarrhoea occurring in troops returning from the Italian front.

1. Due to *B. paratyphosus* A. The serum of patients reacted with this bacillus in a dilution of 1 : 200. A positive haemoculture was also obtained in one case. An autopsy of one case that died showed typical lesions in the Peyer's patches and solitary glands of the small intestine, and in the large intestine.
2. A mixed type characterized by great anaemia. The sera of patients agglutinated *B. paratyphosus* A and also B. Shiga-Kruse, the former in a dilution of 1 : 200, and the latter in a dilution of 1 : 250. Three autopsies were obtained in this class of case, all of which showed extensive ulceration of the colon, sigmoid flexture, and rectum, with lesions of Peyer's patches, etc. as in the first type.
3. A more benign type, showing tenderness and swelling of the sigmoid flexure clinically, with muco-sanguinolent diarrhoea. The autopsy of a fatal case revealed ulceration limited to this region. Serum and bacteriological tests in this class of case gave negative results.

J. B. Nias.

FIESSINGER (Noël) & LEROY (Edgar). **Contribution à l'étude d'une épidémie de dysenterie dans la Somme (juillet-octobre 1916).**—*Bull et Mém. Soc. Méd. Hôpit. de Paris.* 1916. Dec. 21. 3 Ser. Vol. 32. No. 35–36. pp. 2030-2069. With 5 charts.

During the course of the military operations on the Somme from July to October 1916 epidemics of amoebic, bacillary, and mixed amoebic and bacillary dysentery occurred. The chief characters of these epidemics were the wide diffusion and benignity of the cases, due no doubt to the extreme mobility of the bodies of troops and the good physical condition of the soldiers attacked.

The amoebic dysenteries numbered 12. Relapses were rare. In one case an abscess of the liver was cured by emetine. There were three deaths, from multiple abscess of the liver, perforation of the colon, and pulmonary embolism following iliac thrombosis respectively. Amoebic cysts were present in 58 cases. The cysts were passed intermittently. The cases were mostly benign and of short duration. Eight were prolonged and febrile. Emetine was always efficacious.

The mixed amoebo-bacillary forms numbered 26. The amoebae and bacilli seemed to associate their pathogenic action, so that the cases were severe and prolonged. In three cases paratyphoid A was associated with amoebic cysts.

The bacillary dysenteries numbered 84 and were diagnosed by cultures from the stools and agglutination, these two methods supplementing each other. These cases were usually benign. Twelve were prolonged and seven were febrile. In three cases paratyphoid A or B was also isolated. The authors insist on a conjunctivo-urethro-synovial syndrome simulating a gonococcal syndrome and also a choleriform syndrome.

In 27 cases no organism was found and the cases remained unclassed.

Therapeutically, emetine was always successful in the amoebic cases, whilst the serum gave only mediocre results in the bacillary forms.

The association of the two types of dysentery—amoebic and bacillary—completely changed the general physiognomy of the epidemic and rendered particularly difficult and complex both the clinical and laboratory diagnosis.

F. E. T.

NOBÉCOURT (P.). **Dysenteries bacillaires et diarrhées chez des prisonniers de guerre.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. June 14. 3 Ser. Vol. 33. No. 19–20. pp. 764–769.

The author investigated the condition of 99 German soldiers recently taken prisoner and suffering from dysenteriform diarrhoeas, of all degrees of severity—slight, medium and severe. It was only by the appearance of the faeces that the dysentery cases could be distinguished from the diarrhoeas. Neither dysenteric amoebae nor cysts were discovered in any case.

From cultures from 21 dysenteric stools Flexner's bacillus was recovered in 2 cases and the Hiss bacillus in 5 cases, whilst in cultures from 32 diarrhoeal stools Flexner bacillus was obtained once and Hiss 7 times, three of which did not agglutinate the experimental Flexner serum.

In 18 agglutination tests with the blood of dysentery patients positive results were obtained in 4 cases, namely, 3 with Flexner (in one of which Flexner's bacillus was found in the stool) and one (whose stool contained the Hiss bacillus) with both Shiga and Flexner. In 31 agglutination tests of the diarrhoea cases 2 positive results were obtained, namely one (whose stools were not examined) with Flexner and one (whose stool contained the Hiss bacillus) with both Shiga and Flexner.

As regards anti-dysenteric serum the mortality was greater amongst those to whom the serum was administered than amongst the remainder, In the case of the dysentery patients administration of the serum produced a rapid improvement in the symptoms, although in nearly all a banal diarrhoea persisted for a long time. On the other hand the symptoms manifested by the diarrhoea cases did not appear to be in any way influenced by the administration of the serum.

F. E. T.

Sadler (Wilfrid) & Kelso (R. F.). **An Epidemic of Acute Diarrhea approaching in some Cases a Mild Dysentery.**—*Jl. Infect. Dis* 1917. Feb. Vol. 20. No. 2. pp. 140–144.

This epidemic occurred in February and March 1917 around St. Anne de Bellevue, Quebec. The majority of cases occurred among women students, the worst cases occurring amongst those whose resistance was low. Clinically the cases were classified into simple diarrhoea, dysenteric diarrhoea and mild dysentery. There was no mortality. Samples and stools of six patients were examined bacteriologically—organisms with the following reactions were isolated.

Strain	Glucose	Lactose	Saccharose	Maltose	Mannite	Indol.
Shiga ..	..	..	—	—	—	—
Flexner ..	..	..	+	+	+	+
Y (Hiss) ..	..	..	—	—	+	—
Strong ..	..	..	—	+	+	..
Sample B ..	+A	+A	+A	+A	+A	—
Sample C ..	+A	+Alk	+Alk	+A	+A	+
Sample D ..	+A	+Alk	+Alk	+Alk	+A	—
Sample F ..	+A	+A	+A	+A	+A	—

The authors suggest that both acute diarrhoea and dysentery, occurring in the same epidemic, may possibly be due to some variation of the same causal organism. This is the first time that the Shiga group has been isolated so far north as Canada. Their studies indicate that we have a *B. dysenteriae* group analogous to the *B. coli* group.

F. E. T.

Graham (Duncan). **Some Points in the Diagnosis and Treatment of Dysentery occurring in the British Salonika Force.**—*Lancet.* 1918. Jan. 12. pp. 51–55.

This account is based on the examination of over 2,500 cases suffering from dysentery or diarrhoea. Three per cent. or less of the dysentery occurring in this area was of the amoebic type and was cured by the double iodide of bismuth and emetine. Bacteriological examination showed the *B. dysenteriae* Shiga to be the commoner infecting agent in the more severe cases, and *B. dysenteriae* Flexner Y in the milder cases.

In the Salonika Forces stools in the blood and mucus stage of bacillary dysentery were sufficiently characteristic to diagnose the case "clinical bacillary dysentery" and to treat it as such. In faecal stools the presence of cellular mucus in which pus cells predominate or of small groups of pus cells was sufficient to warrant the same diagnosis. A fair percentage of the cases admitted to hospital as simple diarrhoea was a mild form of recurrent bacillary dysentery. That intestinal flagellates produce a dysentery or even simple diarrhoea was not proved. The prevention of dehydration of the tissues by the injection of intravenous salines was of primary importance, and intravenous injections of antidysenteric serum in doses of 60 to 80 cc. were given once or twice daily the first three days with the best results.

F. E. T.

MELLANBY (Edward). **Diagnosis and Treatment of Dysentery occurring in the British Salonika Force.** [Correspondence].—*Lancet.* 1918. Jan. 26. p. 162.

Mellanby considers the results obtained by GRAHAM to be remarkably good [see above], and claims that his (Mellanby's) "Experimental Investigation on Diarrhoea and Vomiting of Children" published in the *Quarterly Journal of Medicine* Vol. 9, April, 1916, gave support from laboratory and animal observations for the treatment of these cases.

He further considers that the importance of the maintenance of the body fluids to normal or above normal in dysenteric cases is now proved both experimentally and clinically, and would also call attention to the part played by diminished body fluids in the onset of these infections, as well as to extreme toxity of the products of the alimentary canal mucous membrane, such as β-imida-zolyl-ethylamine, the formation and liberation of these toxic substances being only influenced to a small extent by bacteria, and these non-specific.

F. E. T.

FLORAND (A.) & BENSAUDE (R.). **Etude radiologique des lésions recto-coliques dans la dysenterie.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris,* 1917. Aug. 2. 3 Ser. Vol. 33. No. 25–26. pp. 963–970. With 9 text-figs.

By employing the method of opaque lavage in the radiological examination of the lesions in the large intestine in cases of dysentery the authors have observed the slight degree of opacity presented by the affected segments, which sometimes appear to be quite empty, as well as the shrunken and atrophied condition of the rectal ampulla and of the sigmoid flexure of the colon.

F. E. T.

HOWELL (Aldred). **The Convalescence of Dysentery and its Complications.**—*Practitioner.* 1917. May. Vo. 98. No. 5. (No. 587). pp. 419–426.

Among 200 convalescent cases of dysentery from Gallipoli admitted to the Third Western General Hospital, Cardiff, during the winter of 1915–16 the following complications were observed :—

Gastro-intestinal.—The pre-suppurative stage of amoebic hepatitis in one case; severe constipation, three cases; persistent diarrhoea probably nervous in origin was also noted.

Cardio-vascular.—Anaemia, 13 cases. Slight cardiac dilatation with normal blood pressure was common.

Nervous system.—Peripheral neuritis, 3 cases.

Arthritis.—Arthritis of knee joints, 2 cases; so-called rheumatism 16 cases.

Pneumonia.—Two cases.

Other Infections.—Enteric, 2 cases; paratyphoid B, 2 cases; paratyphoid A one case.

F. E. T.

SCHROEDER (Albrecht). **Ueber Folgezustände der Ruhr.** [The Sequels of Dysentery.]—*Deut. Med. Woch.* 1917. Sept. 13. Vol. 43. No. 37. pp. 1162–1164.

Working in a suburb of Strassburg during an epidemic of dysentery in the summer of 1916 Schroeder found achylia gastrica to be the commonest sequel. The achylia appeared to have no direct relationship to the severity of the acute bowel symptoms. It became more frequent as the disease progressed, reaching its acme during convalescence. It was encountered most frequently in Shiga-Kruse infections, and was often accompanied by other complications of toxic origin and with bradycardia. The achylia and bradycardia were apparently due to the general intoxication, the toxin circulating in the blood having a harmful effect on the stomach glands and producing bradycardia by vagus stimulation.

F. E. T.

FOGES (Arthur). **Ruhrrezidive nach Bauchoperationen.** [Dysentery Recurrences following Abdominal Operations.]—*Münch. Med. Woch.* 1917. Oct. 9. Vol. 64. No. 41. p. 1344.

Foges records three cases in which herniotomy was performed in patients who had suffered from dysentery at intervals varying from three weeks to one year previously. During convalescence from the operation the symptoms of dysentery reappeared, namely diarrhoea with blood and mucus in the stools. The bacteriological examination of the stools was negative in two cases, whilst in the third *B. dysenteriae* Flexner was obtained. The author considers that the disturbance set up by the thorough emptying of the bowel, usually by senna, in preparing the patient for operation may have provided the stimulus which provoked the recurrence of the dysentery.

F. E. T.

BRILL (E. H.). **Ruhrbehandlung mit Argentum nitricum.** [Treatment of Dysentery with Silver Nitrate.]—*Münch. Med. Woch.* 1917. Dec. 18. Vol. 64. No. 51. p. 1643.

Brill treated all his earlier cases of dysentery by injecting subcutaneously polyvalent anti-dysenteric serum with good results. His therapeutic measures then became limited and he used enemata of silver nitrate with the simultaneous administration of calomel. For the enemata he first used a dilution of 0·5 grammes in 500 cc. and increased the strength to 1 gramme in 500 cc. The mortality of the serum treated cases and those treated by silver nitrate enemata was the same, whilst a shorter convalescence was observed in the cases treated by silver nitrate, and only one case of recurrence was observed after this treatment.

F. E. T.

MARTENS. **Ueber frühzeitige Coecostomie bei Ruhr.** [Early Coecostomy in Dysentery.]—*Berlin. Klin. Woch.* 1917. Nov. 26. Vol. 54. No. 48. p. 1149.

Coecostomy and appendicostomy have long been employed in chronic dysentery, so as to evacuate the large intestine and facilitate irrigation.

Martens recommends coecostomy early in the disease for the same reasons and for the introduction of other medicaments, such as warm saline solution, bolus alba and ipecacuanha infusions, as well as antitoxic and bactericidal dysentery serum in combination with the complement contained in horse serum. The operation is free from danger, as is the subsequent closure of the fistula, which is often spontaneous.

F. E. T.

KULKA (Wilhelm). **Zur Therapie der Ruhr.** [The Therapy of Dysentery].—*Wien. Klin. Woch.* 1917. Oct. 11. Vol. 30. No. 41. pp. 1299–1300.

The author has obtained good results in the treatment of dysentery-like acute and chronic intestinal diseases by the administration of half to three quarters of a litre of Yoghurt in two or three divided doses daily and by irrigation of the bowel twice or thrice daily with 5 grammes of animal charcoal in half a litre of water or physiological saline solution, either in addition to, or in the place of, the usual remedies for dysentery.

F. E. T.

ENGEL (C.). **Ueber Bacterium Proteus and Ruhr.** [*Bacterium proteus* and Dysentery.]—*Münch. Med. Woch.* 1917. Nov. 6. Vol. 64. No. 45. pp. 1460–1462.

In a small epidemic of dysentery observed in a field lazaret a number of cases of dysentery with oedema were observed. In their stools the dysentery bacilli were seldom found (Kruse's dysentery bacillus in 2 cases, and *B. paratyphosus* B in 2 cases) whilst *Bacterium proteus* was often obtained (in 33 per cent. of the Endo plates examined as against 8 to 10 per cent. in the stools of healthy persons and patients suffering from other diseases).

In two cases in which autopsies were performed the intestinal mucosa showed an oedematous condition in addition to dysenteric changes, in which *Bacterium proteus*, but no dysentery bacilli, was found, and the tissue changes were similar to those found in experimental animal *proteus* infections.

Agglutination of *proteus* bacilli with the patients' serum did not occur, and the strains of *proteus* obtained showed biologic variations. Eugel considers that the inability to find dysentery bacilli in the stools of 4 dysentery patients is due to the fact that the little resistant dysentery bacilli are often overgrown by the other intestinal bacteria. The *Bacterium proteus* being usually a secondary invader appears to be a nosoparasite in cases of dysentery.

F. E. T.

CZAPLEWSKI. **Ueber Ruhr.** [On Dysentery.]—*Deut. Med. Woch.* 1917. Oct. 25. Vol. 43. No. 43. pp. 1347–1351. With 4 figs.

Investigating an epidemic of war dysentery in Cologne in 1917, Czaplewski was unable to find dysentery bacilli in the stools, notwithstanding the fact that clinically the condition was a typical dysentery and the cases which died showed characteristic dysenteric lesions. An acid forming capsulated bacillus was often found which Czaplewski calls the capsulated bacillus S, and which he considers to be, not a harmless saprophyte, but a highly pathogenic and toxic organism.

F. E. T.

ABDULLA (M. M.). **Colitis in Waziristan and its Prevention.**—*Indian Med. Gaz.* 1917. Oct. Vol. 52. No. 10. pp. 347–349.

The author describes a small outbreak of colitis amongst Indian troops on active service in Waziristan. The disease was attributed to bad water and bad food. All the cases responded either to simple salines or to castor oil and were fit for duty in two or three days.

F. E. T.

ANDRUZZI (A.). **Brevi note sulla diagnosi di laboratorio delle varie forme di dissenteria.** [Short Note on the Laboratory Diagnosis of Various Forms of Dysentery.]—*Ann. Med. Nav. e Colon.* 1917. Sept.-Oct. Year 23. Vol. 2. No. 9–10. pp. 731–741.

A short and systematic account of the usual laboratory methods for the diagnosis of amoebic and bacillary dysentery, containing nothing new. The work of English investigators receives due recognition. Thus, with reference to amoebic dysentery WENYON is quoted, and in the description of the necessary bacteriological investigations the methods of HENDERSON-SMITH are followed.

F. E. T.

MANLOVE (C. H.). **Two Cases of Balantidial Colitis.**—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1917. May. Vol. 12. No. 3. pp. 149–163.

The first case was that of a Filipino aged 16. He had blood in the stools for several days two months before admission to hospital, but the attack cleared up without treatment. Since then daily chill and fever had occurred with alternate constipation and diarrhoea. The attack for which he was admitted began with frequency of motions containing blood, a motion every fifteen minutes. He was treated previous to admission for amoebic dysentery and after admission a diagnosis was suggested as follows:—bacillary dysentery, pulmonary tuberculosis and malaria. Bodily emaciation, rapidity of pulse, diarrhoea and some fever were the chief facts observed. *Balantidium coli* was found in the faeces with ova of Trichiurus. The blood was negative for typhoid and malaria, the haemoglobin being 75 per cent. Leucocytes on March 2nd 8,400, on March 3rd 15,400, composed of polymorphonuclears 85 per cent., small lymphocytes 10 per cent., large lymphocytes 1 per cent., transitionals 2 per cent. and large mononuclears 2 per cent. The patient died, and at autopsy the following condition was found:—Acute and chronic ulcerative colitis (balantidial), intestinal haemorrhage, acute suppurative pleuritis, broncho-pneumonia, acute parenchymatous nephritis, acute dilatation of the right ventricle of the heart, hyperplasia of spleen, trichiuriasis. A full detailed description of the macroscopic and microscopic findings is given. Balantidia were found in the blood vessels of the muscles at the margin of the ulcers in the large intestine. No Balantidia were found in the affected lung and pleural sac, but the author notes that culture from the pleuritic fluid was negative as regards bacteria.

The second case, a woman of 51, also ended fatally but the gut condition was of secondary importance in this case. The question of pathogenicity and mortality rate from this infection are discussed. The author refers to the work of WALKER, STRONG, BOWMAN, WILLETS and SOLOWJEW.

B. Blacklock.

SPRUE.

ASHFORD (Bailey K.). **The Etiology of Sprue.**—*Amer. Jl. Med. Sci.* 1917. Aug. Vol. 154. No. 2. pp. 157–176. With 10 figs.

The object of this paper is to demonstrate that the species of Monilia first described by the author in March 1915 is the determining etiological factor in sprue, and to suggest that this species be recognised as *Monilia psilosis* Ashford 1914. The organism was isolated from cultures from scrapings of the tongue on glucose agar slants and streak cultures from the faeces on glucose agar plates.

Monilia psilosis is a large round, bright, clean-cut yeast from 4 to 7μ in diameter, with a few granules and a nucleus. There is also usually a pale vacuole in which a violently motile bacillus-like body moves about. The contour is always extremely sharp and well-defined, and this contour becomes a shell-like envelope in older yeasts, often thick at one pole, thus tending to become oval, and giving a true signet ring appearance. Innumerable variations are constantly present, including large numbers of smaller yeast cells reproduced by gemmation and as yet imperfect in development and structure. *Monilia psilosis* always produces mycelial elements, consisting of hyphae 2 to 5μ broad and of all lengths up to 1,000μ. Culturally the most important media are Sabouraud's glucose agar, gelatine and litmus milk. On glucose agar it produces a faint greenish creamy soft elevated growth, with clearly defined borders and a mycelial extension beneath into the growth. On gelatine stab cultures it produces an inverted pine-tree-like growth, with fine long hair-like mycelial extensions into the non-liquified medium. Litmus milk is rendered alkaline. The only sugars normally fermented by *Monilia psilosis* are glucose, levulose, and maltose (typically always), saccharose (often) and galactose (occasionally). In liquid media a more or less abundant sediment collects and there is no clouding of the medium.

Sprue is a disease of the prime of life; affects more females than males; is an urban disease, being much more prevalent in those able to live well; and is a rare disease among negroes. It is a communicable disease and may be found in more than one member of a family. The onset is often acute dating from a severe "indigestion" or other acute inflammatory condition of the upper intestinal tube.

The disease in this series has not been confused with pellagra, although the danger of such confusion is not to be overlooked when the skin lesions of pellagra are absent.

F. E. Taylor.

DOLD (Hermann). **The Etiology of Sprue.**—*China Med. Jl.* 1917. Sept. Vol. 31. No. 5. pp. 387–392.

By the analysis of some hundred sprue stools in China, Dold found that either an Oidium (possibly identical with the Monilias of BAHR and of ASHFORD) or blastomycetes were present in much larger numbers than in normal stools. Pure cultures of the oidia and blastomycetes were fed to dogs, rabbits, monkeys and mice, and produced in the mice a type of diarrhoea which closely resembled typical sprue diarrhoea and in the dogs a transient diarrhoea sprue-like in character. Two of the three monkeys (*Macacus rhesus*) experimented on developed a sprue-like diarrhoea, the stools being soft, voluminous, greyish-white foamy, acid in reaction, and containing large numbers of the oidia and blastomycetes which had been given with the food. Of the two affected monkeys one died, the post-mortem findings closely resembling those of sprue.

In Dold's opinion the essential factor in sprue is a disturbed balance of the bacterial activity in the digestive tract, the activities of organisms of high fermenting power (Oidia, Monilia, Blastomycetes, and possibly others) overpowering the normal bacteriological activities throughout the alimentary canal. He considers that the presence of a predominating number of acid and gas producing microbes throughout the digestive tract explains the characteristic symptoms of sprue and the typical form of the sprue diarrhoea, the anaemia, the emaciation and the shrunken liver.

The presence of an overwhelming number of carbohydrate-splitting microbes accounts for the great loss in carbohydrates, whilst the diminished fat resorption is explained by the acid chyme both impeding the emulsification of the fats and diminishing the action of the lipase. This deficiency of fat resorption produces a disuse-atrophy of the digestive glands with diminution and even arrest of their secretions. Further. Dold believes that the presence of these acid and gas producing microbes and of their products causes an inflammation of the mucous membranes of the intestines, eventually leading to atrophy of the inflamed parts; and it is conceivable that the pancreas also participates in this inflammatory process and consequential atrophy.

F. E. T.

Michel (Carl). **A Study of Toxins and the Serological Reactions in Sprue.**—*Amer. Jl. Med. Sci.* 1917. Aug. Vol. 154. No. 2. pp. 177–181.

The author has investigated the toxicity and serological reactions of the *Monilia psilosis* of Ashford.

Cultures of a virulent *Monilia psilosis* isolated from a fatal case of sprue were toxic to guinea-pigs, 10 cc. killing a guinea-pig in forty-eight hours. No soluble toxins could be obtained. whilst Monilia proteins and endotoxins were found to be the active toxic substances in sprue.

Agglutination tests with a Monilia emulsion were positive only in cases with severe sprue, being negative in mild and latent cases.

Precipitin tests using Monilia filtrates were tried, but did not yield any satisfactory results.

Complement fixation tests were also made, using as antigen a watery emulsion of a four weeks' culture of *Monilia psilosis* on Sabouraud's glucose agar, heated to 58° C. for one hour, with the addition of 0·5 per cent. phenol. A very stable antigen was thus obtained. Liver extracts from a patient dying of sprue made an unsatisfactory antigen. An alcoholic antigen made from emulsions of Monilia was also employed.

Out of 400 tests made in cases clinically diagnosed as sprue—from which *Monilia psilosis* was isolated from the tongue and faeces, the complement fixation test was positive. In cases of chronic and latent sprue, and in cases which had recovered, the reaction tends to become negative. With other Monilia antigens a positive reaction was obtained in 15 per cent. of the cases.

Guinea-pigs inoculated with non-virulent or killed cultures of *Monilia psilosis* also gave positive reactions, the reaction becoming negative as the animal recovered. Cases which had clinical syphilis and sprue gave a positive complement fixation test for both these diseases. Several severe cases of pellagra were also tested, the reaction being negative in all cases except one in which a faintly positive result was obtained.

F. E. T.

MICHEL (Carl). **On the Use of a Monilia Vaccine in the Treatment of Sprue.**—*Jl. Infect. Dis.* 1918. Jan. Vol. 22. No. 1. pp. 53–61.

This vaccine was prepared from autolyzed cultures of *Monilia psilosis* isolated by ASHFORD from a fatal case of sprue. The emulsion of the autolysate was sterilized at 56° C. for one hour with the addition of 0·5 per cent. phenol. For standardisation the killed emulsion was centrifuged, the amount of sediment being 1 per cent. of the standard emulsions used. Six injections of this emulsion were given at intervals of from 8 to 14 days, the primary dose being 0·05 cc. increasing to a final dose of 1·4 cc. A local and general reaction with increased soreness of the tongue and aggravation of the gastro-intestinal symptoms was usually observed, especially after the first injection. The results of the vaccine treatment were very encouraging, the most notable feature being a gain in weight, which was progressive from week to week. There was also a great improvement in the general physical condition of the patient, with disappearance of the Monilia from the faeces. Of 62 patients treated, 49 were discharged cured, 12 were improved and 1 died. A *Monilia psilosis* vaccine should certainly be tried in other localities where sprue occurs.

F. E. T.

WATERFIELD (Noel E.). **A Case of Sprue from Mecca.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. July. Vol. 10. No. 8. p. 197.

A native of Hadramut, aged 60, who had been living in Mecca for some years, presented himself for treatment at Port Sudan, complaining of loss of flesh, frequent stools and soreness of the tongue of three months duration. There was also much pyorrhaea alveolaris, and the mouth was full of septic stumps. CHALMERS of the Wellcome Research Laboratory obtained a pure culture of *Monilia enterica* from the saliva and faeces.

All septic stumps and carious teeth were removed. The diet was restricted to milk with an occasional orange, and salol and beta napthol were administered in a bismuth mixture. Within four days the diarrhoea stopped, and in a fortnight the patient left hospital, having put on nearly half a stone and considering himself cured. The cure appeared to be permanent and the exclusively milk diet was persisted in.

F. E. T.

HIATT (Houston B.). **Sprue.**—*Reference Handbook of the Med. Sci.* pp. 917–919.

This is an excellent systematic account of sprue, especially as it occurs on the American Continent, great stress being laid on its history in America, from its first mention in American literature in the writings of John BRICKNELL in 1737 to WOOD's paper on "Sprue in the United States" presented before the Association of American Physicians in May 1915. A good systematic account of the etiology, pathology, diagnosis and treatment of sprue follows.

F. E. T.

MALARIA

PUNJAB. **Report on Malaria in the Punjab during the Year 1916, together with an Account of the Work of the Punjab Malaria Bureau.** By Col. H. HENDLEY [M.D., K.H.S., I.M.S.], Chief Malaria Medical Officer, Punjab.—18 + xxxiv pp. With 3 charts & 4 maps. 1917. Lahore: Printed by the Superintendent, Government Printing. [Price Rs.2 or 3*s*.]

Deaths from "fevers"—a term which, when plague does not complicate matters, is almost synonymous with malaria fevers—numbered 376,033 in the Punjab during the year 1916, a death rate of 19·44 per 1,000. In Lahore, the capital of the province, the death-rate for fevers was 21·13 per 1,000.

Altogether the year is considered to have been unfavourable to Anopheles: abnormally heavy rain in July and August disturbed the breeding-places, an unusually dry September dried them up, and heavy rains again early in October flushed them out at a critical season.

Attention was directed particularly to the question of infectibility of *Anopheles rossi*: innumerable dissections were made, with a negative issue. And yet at Khewra, in the Jhelum District, where the spleen-index is 64·46, the only species known is *A. rossi*. It is pointed out, however, as a significant fact, that among the few breeding-places at Khewra, which is at the foot of the Salt Range, there is a brackish stream. The question will be investigated further.

At Katas, in the sacred tank, Anopheles larvae were abundant, although the tank is full of fish of species whose young are known elsewhere to feed upon larvae. The same phenomenon was observed in the ponds of the Shalamar Gardens at Lahore, to which no particular sanctity attaches. Also in the ponds of the Lawrence Gardens at Lahore ducks and Anopheles larvae live happily together.

Efforts to quinine school-children were not very successful: apparently the local dominies were not sufficiently interested in the matter. Quis custodiet ipsos custodes? But steps have been taken to see that this does not occur again.

A. Alcock.

SULDEY (E. W.). **L'index endémique du Paludisme à Madagascar Valeur de la formule leucocytaire dans l'évaluation de l'index, comparativement à la splénomégalie, l'hématozoaire et les mélanifères.**—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 915–923.

The author tabulates and discusses very critically his observations of children, in a very insalubrious district on the west coast of Madagascar, for determining the endemic index of malaria. He concludes that neither splenomegaly alone, nor the presence of parasites alone gives the true index, since malarial infection may exist without any indication of either; but that the true index can only be determined if the melaniferous leucocytes be also taken into consideration as a third factor. Finally the index may be confirmed by leucocyte count, and the author gives the following table of leucocyte-formulae at divers ages, determined from cases in which parasites were actually observed in the blood:—

Leucocytes	1-3 years	4-6 years	7-9 years	10-12 years
Neutral multinuclears ..	28	35	34	31
Lymphocytes	50	48	47	52
Large uninuclears ..	14	10	11	8
Eosinophile multinuclears	8	7	8	9
Basophile multinuclears	0·5	0·5	0·5	0·5

The author does not fail to notice that the possibility of syphilis must not be overlooked among the inferences from both splenomegaly and increase of large uninuclears, and that intestinal worms must be discounted from the evidence offered by the eosinophiles.

A. A.

SIMPSON-WELLS (A.). **Notes on Malaria.**—*S. African Med. Rec.* 1917. Nov. 24. Vol. 15. No. 22. pp. 344–347.

General remarks upon malarial fever and its treatment. The manifold disguises assumed by malaria are noticed, and abstracts of two cerebral cases of pernicious malaria, in one of which the symptoms were almost like those of acute mania, are given. The author has found intramuscular injections of quinine very satisfactory in cases that resist other methods. Prior to an intravenous injection he is accustomed to abstract about half-a-pint of blood. He thinks galyl has a tonic effect, and that it assists the action of quinine, and he approves of its use in anaemic cases with frequent relapses.

In the subsequent discussion Colonel MAXWELL mentioned that at a General Hospital known to him, where the symptoms following operations had suggested contamination of ligatures or dressings, malaria was discovered to be the cause of the alarming symptoms.

A. A.

ANDREOTTI (Marino). **La precarietà del cosiddetto Anofelismo senza malaria. Nota di profilassi antimalarica nella popolazione civile e nell' esercito.** [The Insecurity of So-Called Anophelism without Malaria. A Note on Anti-Malarial Prophylaxis in the Civil and Military Population.]—*Policlinico.* Sez. Prat. 1917. Dec. Vol. 24. No. 51. pp. 1492–1494.

Notes of a case in which a soldier on leave from the Italian army developed malaria with the result of infecting two children in the house. The locality was one in which Anopheles mosquitoes were plentiful, but malaria usually absent. The cases occurred in the latter end of May and the beginning of June, when mosquitoes usually begin to appear in the locality. The greater part of the paper is devoted to a discussion on the general question of neglecting mosquitoes while giving quinine.

J. B. Nias.

MOLA (G.). **La campagna antimalarica del 1916 alla base navale di Vallona.** [The Anti-Malarial Campaign at Valona during 1916.]—*Ann. Med. Nav. e Colon.* 1917. July-Aug. Year 23. Vol. 2. No. 7–8. pp. 578–583.

A report dealing with the treatment of malarial cases at the Italian naval base of Valona in the Adriatic during the year 1916. Out of a total strength of about 1,600 men in port, the number of cases between June and October was as follows:—

June	24	= per cent.	1·47
July	214	„ „	13·0
August	311	„ „	18·0
September	238	„ „	14·0
October (1st half)	0	„ „	0

The types of fever noted were tertian and aestivo-autumnal only. Preventive treatment with quinine was enforced rigorously, while all collections of stagnant water were carefully petrolized. Patients in hospital received a subcutaneous injection of 3 grammes of quinine at the outset of the fever, with 1 gramme daily afterwards as long as the fever lasted, or for a minimum of 10 days. After this the patient took by the mouth quinine in tabloids to the extent of two or three times the ordinary prophylactic dose. Thanks to this vigorous treatment, bad results were rare, even with the aestivo-autumnal form.

J. B. N.

FIORITO (G.). **Su di alcune particolarità del reperto emoparassitologico dell' infezione malarica.** [Some Unusual Results of Blood-Examination in Malaria.]—*Ann. Med. Nav. e Colon.* 1917. July-Aug. Year 23. Vol. 2. No. 7–8. pp. 583–596.

Studies in the haemo-parasitology of malaria made at Valona by the author, dealing with matters of minute microscopical detail and not of much general interest. The paper is not in any way illustrated, as it should be, to be of any real use. The quartan parasite was never observed. The mosquitoes collected were *A. maculipennis, bifurcatus* and *superpictus,* in order of frequency.

J. B. N.

ROSSI (Giacomo). i. **I nuovi orizzonti delle ricerche antimalariche ed i nostri impianti sperimentali.** [New Ideas on Anti-Malarial Research and Experimental Stations.]—*Malariologia.* 1917. Aug. 15. Ser. 2. Year 3. No. 4. pp. 73–83. With 11 figs.

ii. **Il Mezzogiorno e la Bonifica Agraria.** [The South of Italy and Drainage Works.]—*Ibid.* pp. 84–87. With 4 figs.

FERMI (Claudio). iii. **Deve preferirsi il metodo antianofelico od il metodo agricolo per smalarizzare una località?** [The Relative Merits of Anti-Mosquito Campaigns and Intensive Culture, as Preventives of Malaria.]—*Ibid.* pp. 88–89.

These three papers are chiefly occupied with a personal controversy between the two authors on the relative advantages of drainage and quinine-prophylaxis, on the one hand, and intensive cultivation of the land, on the other, as regards the suppression of malaria. Professor Fermi is an advocate of the former system, and Professor Rossi of the latter. Professor Rossi holds that if land is sufficiently well cultivated, there will be no malaria, even in the presence of stagnant water and Anopheles mosquitoes, and cites an instance in point. Rossi's first paper contains several interesting illustrations of an experimental station for the study of the fauna and flora of marshes, and other matters connected with malaria.

J. B. N.

KISSKALT (Karl). **Ueber Malariarezidive.** [Malarial Relapses.]—*Deut. Med. Woch.* 1917. Dec. 6. Vol. 43. No. 49. p. 1527.

The malaria figures, obtained by blood examinations, in the year 1916 for the troops in East Prussia (First Army Corps) and the prisoners of war are given. Infections were not seen till April, increased till July, and tailed off to October. Of the 165 infections all but four were benign tertian. Three patients must have become infected in Germany; by far the majority had been in Russia or the Balkans in 1915. Relapses are usually attributed to excessive exertion or the bites of over-wintering Anopheles; but here over-exertion was at least as great in the winter, and if Anopheles had been the cause there would have been cases in barracks and among the civil population. The conclusion is that relapses of malaria in the spring are produced by sunlight just as is the case with pellagra. REINHARD and HEINRICH are quoted in support [this *Bulletin*, Vol. 11, p. 34, and below].

A. G. B.

KABELIK (J.). **Einige Bemerkungen zur Pathogenese und Pathologie der Malaria.** [Remarks on the Pathogeny and Pathology of Malaria.] — *Wien. Klin. Woch.* 1917. Dec. 20. Vol. 30. No. 51. pp. 1616–1618.

The gist of this article, which deals with the pathogeny of relapses as studied by the author in the post mortem room, is that it is the business of the spleen to filter off effete parasites and pigment, whereas the seat of undamaged parasites and division forms is the bone marrow. In the marrow are found " plasmatic " forms, rings, typical gametes very seldom, and mature crescents hardly ever. The cause of relapse he believes to be the " plasmatic " forms in the resting state. These normally develop into sexual forms, but in the event of a great stimulus are poured into the blood.

A. G. B.

GRALL. **Malaria des Armées en campagne.**—*Ann. d'Hyg. Pub. et de Méd. Légale.* 1917. May. Vol. 27. 4 Ser. pp. 283–344. With 19 charts.

The subject is treated somewhat discoursively, and apart from its discriminative attention to clinical phenomena the paper is considerably speculative. The author regards malaria as it usually occurs in armies of occupation as an epidemic, often complicated with epidemic amoebiasis. He emphasises this association, since the dysenteric or hepatic complication is commonly overlooked in such cases, which are then treated unsuccessfully as malaria when they ought to be treated specifically as amoebiasis. In dealing with primary malarial infections he distinguishes between primary infections of the spring and primary infections of the aestivo-autumnal season. In the former the symptoms are those of a febricula—a temperature continuously a little above the normal but declining in the evening, gastric derangement, and a mere feeling of indisposition; the genuine tertian type of malaria indeed is never an early manifestation of primary infection, but always a late one. In primary infections of the summer the symptoms are those of continuous fever. Re-infections in all chronic cases are manifested by relapses of the tertian type; and this may explain the fact that a patient whose blood on admission to, and shortly before discharge from, hospital exhibits only *P. vivax*, yields only *P. falciparum* during the continuation of the fever in the epidemic period. The re-infection is followed in due time by an access of fever which starts the old infection; and this of course occurs in cases where the original infection was not recognised or was wrongly diagnosed. The cause of the cachexia of acute malaria does not appear to have been explained, in the author's opinion. Whatever may be the ultimate explanation of the haemoglobinuric complication in chronic malaria, sudden cold is an exciting cause. Prevention is discussed in all its aspects—general prophylaxis, anticipation of relapses, segregation of patients, etc. A certain amount of acquired immunity has been observed, particularly among the African contingents in Macedonia.

A. A.

VON HEINRICH (Hans). **Mischinfektionen und Latenzerscheinungen der Malaria.** [Mixed Infections and Phenomena of Latency in Malaria.]—*Wien. Klin. Woch.* 1917. Oct. 18. Vol. 30. No. 42. pp. 1317–1320.

This paper gives statistics of 1029 cases treated during seven months at the Malaria Hospital, Sarajevo, as shown in the following table. There were 150 mixed infections, namely tropical + benign tertian 140, tropical + quartan 5, all three forms 4.

The mixed infections in most cases were not diagnosed until the latent benign tertian parasites appeared in the spring, which is their optimum period of development, just as autumn is the optimum period for the tropical parasite. The two parasites can be co-existent; each has its own characters; no transitional forms were seen; so that there is no evidence that one changes into the other as has been supposed by LAVERAN and others. In recording the type of parasite dates should always be given.

Month	Number of exams.	Findings		Tertian			Tropical			Quartan
		Positive	Negative	Young forms	Half-grown	Full-grown	Rings	Crescents	Rings and crescents	
October ..	207	137	70	2	1	6	58	29	33	3
					9			120		
November	511	178	333	2	—	7	52	77	39	—
					9			168		
December .	410	202	208	2	—	7	72	73	43	1
					9			188		
January ..	514	273	241	6	2	31	82	83	55	1
					39			220		
February -	573	321	252	22	16	60	58	106	39	3
					98			203		
March ..	133	40	93	5	—	13	10	7	3	2
					18			20		
April ..	832	346	486	56	9	165	31	59	12	1
					230			102		
May ..	507	181	326	37	20	62	12	35	3	3
					119			50		

Noting that in winter the intervals were long and the relapses slight, whereas the frequency and severity increased in the spring, the author tried to produce relapses by exposure to the sun. With benign tertian his experiments were usually successful if the patient lay in the sun for an hour with his clothes on.

A. G. B.

MUEHLENS. **Praktische Winke zur Erkennung und Verhütung von Malariagefahren.** [Hints on the Recognition and Prevention of Malaria.]—*Deut. Med. Woch.* 1918. Jan. 3. Vol. 44. No. 1. pp. 7–9.

This paper contains little that is new. To render a latent malaria active and bring the schizonts into the circulation, where they can be recognised and treated, the author advises cold douches to spleen hot packs, or ultra-violet irradiation [see this *Bulletin*, Vol. 11, p. 34].

Parasites should never be classified as quinine-fast without the most exhaustive investigation. Recent experience has modified prophylactic estimates of quinine, and has more and more confirmed the anti-mosquito policy. An account is given of the French anti-malaria campaign proposed by LEGROUX [see this *Bulletin,* Vol. 10, p. 172].

A. G. B.

MUNK (Fritz). **Kriegserfahrungen bei Malaria.** [War Experience of Malaria.]—*Berlin. Klin. Woch.* 1917. Nov. 19 & 26. Vol. 54. Nos. 47 & 48. pp. 1131–1134; 1152–1156. With 10 charts.

A lecture containing some observations of interest. The locale was a military hospital into which were collected all the cases of malaria from Poland and Wolhynia, in nearly every instance benign tertian. A table impresses statistically the generally recognised advantage of solutions over quinine in tablet form. Salvarsan, it is stated, will almost invariably cut short an attack of benign tertian, without however lasting benefit. It was given (1) if the patient was admitted in wretched condition and it was desired to give him a period of rest from quinine; (2) if quinine was borne badly owing to stomach or intestinal trouble; (3) "in relative or absolute quinine resistance"; in any case quinine was resumed as soon as possible. It was not practicable to keep the patients under observation longer than 50–60 days, so that the author recognises that he cannot compute the number of recoveries. In doubtful cases however he employed a test or ordeal: quinine having been omitted for 8–10 days the patient was made to run, chop wood, put his feet in cold water, or take a steamer excursion or rowing exercise; or he was put in a convalescent company. In other instances an intravenous injection of nucleo-hexyl was given. If the result of the stimulus was a relapse, the patient was subjected to treatment afresh. The treatment results were extraordinarily good, for it is stated that 96 per cent. of the cases were discharged to war duty after two months or, in a small number of cases, three [actual figures are not furnished]; there were no deaths. The favourable results are attributed to individual attention and especially to the excellence of the climate. Quinine prophylaxis was not practised; every case was detected as early as possible and removed at once to the hospital, where all precautions were taken to avoid spread of infection. It is stated that the results were excellent and the occurrence of cases was only sporadic; in neighbouring bodies of troops who received quinine regularly the incidence of malaria was much greater.

A. G. B.

KELLER. **Die Bedeutung der Malaria für die Heimat.** [The Importance of Malaria to German Practitioners.]—*Deut. Med. Woch.* 1917. Nov. 29. Vol. 43. No. 48. pp. 1505–1506.

Gives hospital cases in which without a history of malaria an attack of fever occurring after admission was found to be due to malarial parasites; the patients in question were admitted for gonorrhoea, double pneumonia with middle ear suppuration, tape worm and itch. Persons who have contracted malarial infection are now numerous in

Germany and will be more so after the war when the large number of soldiers serving in malarious regions return. The moral is the importance of blood examination in all cases of fever the subjects of which have served abroad.

A. G. B.

PIELSTICKER (F.). **Die Malaria in Rumänien und ihre Bekämpfung bis zum Jahre 1916.** [Malaria in Roumania and Anti-Malarial Measures up to 1916.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Oct. Vol. 21. No. 19. pp. 317–329. With 1 map.

This paper is compiled from the Rumanian records of the last twelve years, the chief authorities quoted being BABES, IRIMESCU, LEON and others, all of whom wrote in the Rumanian language. The whole country has been malarious for hundreds of years. BABES in 7,000 autopsies rarely failed to find evidence of malaria and expresses the opinion that an enlarged spleen is almost a characteristic of the Rumanian. Accurate statistics are not available but IRIMESCU has reached the conclusion that 250,000 to 300,000 cases occur every year. The most severely affected regions lie between the Pruth and the Sereth rivers; the Danube region and the Dobrudja are only a little less affected. The mortality is decidedly less than that in Italy and this is attributed to the preponderance of benign tertian; all three forms are found and blackwater fever occurs. Fresh cases are first seen in mid-June. The carriers are *Anopheles maculipennis* and *A. pseudopictus* which are widely distributed. Little has been done to get rid of them and the problem of drainage seems to be a difficult one. Excellent results, if one may judge from the figures cited, have been obtained from prophylactic quinine.

A. G. B.

CARNOT (P.). **Les accès palustres de Macédoine: leur évolution chez les rapatriés; leur signification.**—*Paris Méd.* 1917. July 28. Vol. 7. No. 30. pp. 78–85.

A long and interesting paper on malarial fever as observed among men invalided from Macedonia, from which as it covers ground that is fairly well known it is only necessary to make a few selections.

Several cases have occurred where the first symptoms appeared in France long after the original infection in Macedonia—latent malaria.

Relapses in chronic cases sometimes occur in groups or showers—interruption of the normal rhythm. A relapse sometimes occurs without any premonitory symptoms.

In the early part of the first year *P. vivax* was the usual parasite: in the later summer and in the autumn *P. falciparum* was predominant: then again from December to May *P. vivax* predominated. The author is inclined to think that mixed infection explains these phenomena, the original conditions in Macedonia, where a man might be bitten by Anopheles twenty times in a night, being favourable to multiple and mixed infection.

In the treatment of chronic malaria the author advocates intensive quinine combined with continuous arsenic, and prefers arsenobenzol to other arsenical compounds. In the long run, the author thinks, the disease disappears through acquired immunity.

A. A.

LAGRIFFOUL (A.) & PICARD (F.). **Remarques sur le paludisme dans la XVIe région. Cas autochtone à** ***Plasmodium praecox.***—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 883–885.

The authors have examined, at Montpellier, several hundred cases of malaria contracted in Macedonia, besides cases contracted in Algeria and Morocco, and also in France. Most of the Macedonia cases were infections that had occurred from June to October, when the presumptive infection would be *P. falciparum*, but in the great majority of the authors' examinations it was found actually to be *P. vivax.* Only twice was a mixed infection of both species observed. Most of the infections from Morocco were *P. falciparum.* In all but one of the cases examined by the authors the original specific diagnosis was confirmed. Notwithstanding that the authors have themselves encountered cases of autochthonous infection, they are convinced that there has lately been a recrudescence of malaria in France consequent on the return of invalided troops from abroad, and they are not fully persuaded that *all* the cases reported as autochthonous are really so. Happily among the autochthonous cases *P. falciparum* has not yet been discovered, the single supposed autochthonous case of this infection being in the authors' opinion open to criticism.

A. A.

MARCHOUX (E.). **Influence du milieu extérieur sur la résistance de l'organisme au paludisme.**—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 1–3.

A criticism of the work of MM. LAGRIFFOUL and PICARD, maintaining with much pith and point, in opposition to those observers, (1) that mixed malaria infections are by no means rare, and (2) that the disappearance of *P. falciparum* from the blood of invalids returned to France cannot be the *direct* effect of climate, but is rather to be ascribed to the effect of climate upon the natural resistance of the patient. As an instance in point, the author quotes the observation of PRÉVÔT, at the Pasteur Institute of Garches, that the serum of horses that have been kept out of doors in winter is more active than that of horses wintered in the stable.

A. A.

LACASSAGNE (Antoine). **Considérations pratiques sur la prophylaxie et le traitement des paludéens en Macédoine.**—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 923–932.

A well-written and interesting account of the author's experiences of malaria in Macedonia, but not containing anything new. The author thinks that the grave complexion of the disease in Macedonia is attributable to constant re-infection owing to the insufficiency of protection against mosquito-bites. In the actual management of cases he believes in continuous quinine treatment by the mouth, and he is satisfied that a daily dose of 0·4 gm. may be continued for many months. In addition to this continuous treatment (0·4 gm. daily) he superposed an intensive treatment for relapses, consisting in ordinary cases of 0·8 gm. three times daily for a term of 3 or 4 days, and in bad cases of 0·8 gm. three times a day for two days in each week as long as might be necessary. Intravenous injection he reserved for pernicious cases, and intramuscular injection for cases of real or feigned gastric intolerance. As prophylactic measures he was satisfied with screens, mosquito-nets, culicifuge applications, and a daily ration of 0·4 gm. of quinine with the quotidian evening soup.

A. A.

ROUSSEAU (P.). **Reviviscence, en 1916, d'un foyer endémique de paludisme en Beauce.**—*Bull. Acad. de Méd.* 1916. Nov. 7. Vol. 76. Year 80. No. 44. pp. 367–368.

The author reports an endemic malaria-area at Beauce in the Department Eure-et-Loir, on the banks of a small stagnant intermittent tributary of the Loire. He witnesses to the presence of *Anopheles maculipennis*, and to the occurrence of at least five cases of malarial fever in 1916. No possible importation can be suspected, no stranger, no soldier, having visited the place.

A. A.

RAYMOND (Victor). **Paludisme autochtone.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Nov. 29. 3 Ser. Vol. 33. No. 31–32. pp. 1167–1169.

The author has discovered two localities in different parts of the front in France, which have recently become infected with malaria. In both of them small epidemics of malaria have occurred among individuals who have never been out of France, and in both of them the necessary conditions of infection have been determined—namely the presence of *Anopheles* in abundance, and of human carriers, the latter being invalids returned from Salonica. The parasite observed in the home-bred cases was *P. falciparum* in one case. and *P. vivax* in all the others.

A. A.

MALLOIZEL & BONNARD. **Note sur le Paludisme autochtone dans la presqu'île de Langle (Golfe du Morbihan).**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. p. 805.

The authors report the existence of indigenous malaria in the Langle Peninsula in the Gulf of Morbihan (Brittany); 8 cases of quartan and 5 of benign tertian were observed: it yields readily to quinine.

A. A.

JAMES (S. P.). **Note recording the Proof that *Anopheles maculipennis* is an Efficient Host of the Benign Tertian Malaria Parasite in England.**—*Jl. Roy. Army Med. Corps.* 1917. Nov. Vol. 29. No. 5. p. 615.

Not finding any evidence of infection in 67 specimens of *maculipennis* caught in the sick quarters of patients at Sheerness suffering from locally contracted malaria, the author, between 30th August and 15th September, made some feeding experiments with this species. In 2 out of 6 specimens fed on a patient carrying gametes of a benign tertian contracted at Sheerness he demonstrated, on the 17th September, numerous zygotes in different stages of development.

A. A.

FULLER (E. B.). **Malaria in Relation to Surgery.**—*S. African Med. Rec.* 1917. Nov. 10. Vol. 15. No. 21. pp. 328–329.

The author describes his novel experiences of operating on malaria-carriers as "Adventures of a surgeon in malaria-land." In such patients an operation of any kind almost always provokes an attack of malarial fever, to the consternation of the surgeon who is unaware of the latent malaria. Such patients take all anaesthetics badly; they do not go under easily, and when under they are prone to sudden collapse. Ether is the safest anaesthetic, particularly the warmed vapour. The author notices the frequent occurrence of spurious cases of the "acute abdomen" genus in malaria, and gives some instances where examination of the blood and response to quinine clarified ambiguous symptoms that at first might have suggested an appeal to the surgeon.

A. A.

MOREAU (Laurent). **Paludisme et blessures de guerre.**—*Arch. Méd. et Pharm. Nav.* 1917. Nov. Vol. 104. No. 5. pp. 321–325.

A brief but useful survey of the influence of traumatism on the malarial diathesis, a subject which, as the author remarks, is not new to medical officers who have served in the tropics. Among the invalids from Macedonia the author has noticed abundantly the effect of wounds and surgical operations in provoking the first display of a latent infection, and in resuscitating a dormant chronic infection of malarial fever. He notices that the malarial complication retards cicatrisation of wounds and consolidation of fractures, and much increases the toxic action of chloroform. The author expresses confidence in quinine. In two grave cases injection of novarsenobenzol was followed by a disappearance of the parasites. Adrenaline is a useful adjunct in asthenic cases.

A. A.

DUNLEY-OWEN (A.). **Malarial Wards in Hospitals.**—*S. African Med. Rec.* 1917. Dec. 8. Vol. 15. No. 23. pp. 359–360.

The author is of opinion that in all hospitals where many malaria cases are treated there should be two malaria wards—one for acute cases, under trained nurses; the other for chronic cases, served by orderlies. Relapses would be transferred immediately to the ward for acute cases; acute cases would be transferred to the ward for chronics as soon as the blood was negative. Diets would be supplied not to individual patients but to wards, to be made use of as necessitated by transfers from ward to ward. Much economy in every direction would be the result.

A. A.

ULLMANN (B.). Beobachtungen an lebenden Malaria-Plasmodien. [Observations on Living Malaria Parasites.]—*Virchow's Arch. f. Path. Anat.* 1917. July 30. Vol. 224. No. 1. pp. 56–65.

After informing the world that failing eyesight rather hinders him from observing a single preparation for more than three or four hours at a stretch the author of this prolix paper, having had an opportunity of examining living malaria-parasites, naively proceeds to describe what he saw—with occasional digressions after analogies with leucocytes and salivary corpuscles—as if no one had ever watched a malaria parasite before. The observation of pigment in leucocytes provokes copious excogitations, which end in the hypothetical proposition that leucocytes might quite as easily be transporters as destroyers of malaria-parasites.

SCHAUDINN is mentioned two or three times, and CELLI and GUARNIERI are just alluded to once; no other authority on malaria exists so far as this contribution to the subject is concerned.

If this were the first paper of the kind that he has seen during the last two years the reviewer would greatly hesitate to say what—notwithstanding the admonitions of Truthful James—someone will have to say sooner or later, and that is that there seems to be afoot a sort of *Durchdrängung* with the object of making malaria a German territory.

A. A.

FREEBORN (Stanley B.). The Rice Fields as a Factor in the Control of Malaria.—*Jl. Econom. Entom.* 1917. June. Vol. 10. No. 3. pp. 354–359.

A paper of a speculative kind. The moral of it appears to be the obvious one that the malarial possibilities of rice-fields can only be determined, in any locality, when the species of Anopheles that breed in them have been determined. In the Philippines, for instance, the rice lands are remarkably free from malaria, since they are breeding-grounds principally of *A. rossi.*

A. A.

GARIN (Ch.) & GIRARD (A.). Recherches hématologiques chez les paludéens, entre les accès et pendant les accès.—*C. R. Soc. Biol.* 1917. Nov. 10. Vol. 80. No. 17. pp. 840–841.

The authors' researches extended to fifty cases, of which only the *mean figures* are here reported.

The percentages of leucocytes are as follows:—

	Poly-neutro-philes.	Eosino-philes.	Large uni-nuclears.	Small uni-nuclears.	Lympho-cytes.
During a paroxysm	67·2	1	17·8	10	4
In the interval ..	59·2	3·1	17	12·7	8

The globular resistance was during a paroxysm 47: in the interval 44·71. The infected red cells were as much resistant as the normal red cells.

The number of red cells in the interval was 4,667,000: at the moment of a paroxysm 4,200,000—the altitude of the observations being 1,050 metres.

A. A.

GARIN (Ch.) & SARROUY. **Les variations de la formule leucocytaire dans le paludisme secondaire.**—*C. R. Soc. Biol.* 1917. Nov. 24. Vol. 80. No. 18. p. 880.

Records of the leucocyte formulae of 106 observations, 62 of which were made during the febrile fits and 44 in the intervals.

Mean leucocyte formula.	In paroxysm.	In interval.
Neutrophile polymorph. ..	67·1	58·7
Eosinophile polymorph. ..	5·2	5·3
Large uninuclear	15·7	19·2
Small uninuclear	8·4	12·2
Lymphocyte	3·6	4·6

A. A.

GARIN (Ch.) & PASQUIER (Ch.). **L'image d'Arneth et l'indice nucléaire neutrophile chez les paludéens.**—*C. R. Soc. Biol.* 1917. Dec. 8. Vol. 80. No. 19. pp. 915–916.

Records of 72 patients, the observations including benign and malignant tertian, febrile fits and intervals, and urticarial complications. The films were stained with haematin eosin, and the enumerations were made by the Sabrazès method (in GILBERT et WEINBERG, *Traité du Sang*). The conclusions stated are that the nuclear index is considerably below normal in malarial cases (i.e., Arneth deflected to the left) and is at lowest during the febrile fit; that it is lower in malignant tertian than in benign tertian infections; and that in urticarial cases it is not so low as in the other malarial cases examined.

A. A.

GARIN (C), SARROUY & POUGET. **Les syndromes surrénaux frustes dans le paludisme secondaire.**—*Progrès Méd.* 1917. Sept. 29. Vol. 32. No. 39. pp. 324–326.

The author draws attention to an obscure form of suprarenal complication which he has observed in 4 per cent. of his cases of chronic malaria. The general symptoms are an extraordinary pallor, emaciation, asthenia, anorexia, and failure to profit by hill climate. The particular symptoms are tachycardia, a small soft pulse (arterial tension ma. about 12, mi. about 7, Pachon), enlarged and tender liver, diarrhoea alternating with constipation, Sergent's line, and various curiosities of skin pigmentation. The number of red blood cells is about normal, but their haemoglobin component is reduced to 0·70.

Such cases should be treated with adrenalin, and also with iron and arsenic, in addition to the routine quinine treatment for the malaria.

A. A.

GARIN (Ch.) & PASQUIER (Ch.). **Urticaire et paludisme.**—*Lyon Méd.* 1917. Nov. Vol. 126. No. 11. pp. 499–504.

The authors regard urticaria as a symptom of definite significance in the relapses of chronic malaria. They observed it in 30 per cent. of their cases: and in 72 per cent. of the observations it was concurrent with diarrhoea. In the blood of 25 urticaria cases examined in the intervals the proportion of multinuclear leucocytes was considerably decreased and that of uninuclears considerably increased, and the globular resistance was about normal. The authors' conclusion is that general urticaria signifies impaired reaction and a grave infection.

A. A.

MIGLIORINI. **Emorragie retiniche da infezione malarica.** [Retinal Haemorrhages of Malarial Origin.]—*Morgagni.* (Archivio). 1917. Feb. 28. Vol. 59. No. 2. pp. 70–72.

The patient was a married woman, aged 38, who had suffered for 2 months from malarial fever. There was no history of syphilis, and the urine was normal. Some 12 days before examination the patient had noticed one morning, on rising, that objects seen with the right eye appeared covered with a veil. On examination, the visual acuity of the right eye was found to be reduced to 1/10, while the field of vision was reduced on the inner side, the left eye being normal. With the ophthalmoscope a large haemorrhage was visible in the superior-internal quadrant. The rest of the retina was clear and transparent. In the macular region there was a small white effusion, about one-third of the diameter of the papilla, oval in form, and below it were 5 linear haemorrhagic streaks. The further progress of the case is not given.

J. B. N.

ZUELZER (G.). **Klinisches über Malaria. Die Leberperkussion.** [Liver Percussion in Malaria.]—*Deut. Med. Woch.* 1917. Nov. 29. Vol. 43. No. 48. pp. 1502–1505.

The author claims to be able by light percussion of the liver to detect an impending relapse in chronic malaria. Normally with deep inspiration in recumbency the absolute liver dulness in the mammary line is 4·5 to 5 cm. high; in the acute swelling of malaria it rises to 6, 8, or 11 cm.

The author describes a malaria rash, seen on the costal arch, fold of the groin, inner side of thigh, or upper part of nates: irregular bluish red to brown spots, and rings of the size of a lentil to that of a two-mark piece: similar to that of syphilis, but paler, or like the patches described by MURCHISON in typhus.

A. G. B.

MOREAU (Laurent). **Parotidites suppurées d'origine palustre.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Oct. 25. 3 Ser. Vol. 33. No. 27–28. pp. 1027–1028.

Parotitis, which is most often double, may occur in any stage of malarial infection. The inflammation, which generally ends in suppuration, spreads from the mouth, and the pus contains the ordinary forms of coccus. Owing to sloughing, deep burrowing of pus, and the formation of pockets and fistulae, recovery is tedious. The complications that have been observed are secondary haemorrhage (in one of the author's cases both the external carotids had to be tied), facial paralysis, arthritis of the jaw-joints, and decalcification of the jaw condyles. The prophylactic measures recommended are buccal antisepsis, and the avoidance or counteraction of everything in the general treatment of the malaria that tends to dehydrate the blood or to dry the mouth. Two illustrative cases are abstracted.

A. A.

McWalter (J. C.). **Parotitis and Malaria.**—*Med. Press & Circ.* 1917. July 4. Vol. 104. No. 4078. pp. 548–549.

A pleasant rambling discourse on many things besides malaria and parotitis. The author thinks that in parotitis complicating malaria or dysentery the gland should not be opened.

Among his divers meditations the author lingers fondly on the *vis medicatrix naturae*; but in tropical medicine, at any rate, many would rather agree with Sir William Gull that in nine cases out of ten Nature's intention is to kill the patient, not to cure him.

A. A.

de Brun (H.). **L'amnésie paludéenne.**—*Presse Méd.* 1917. Nov. 1. Vol. 25. No. 61. pp. 625–626.

The author draws attention to amnesia as a frequent interlude in the malaria-drama. In the febrile paroxysms of a first infection the author distinguishes a lacunar amnesia, where, after recovery from a febrile state complicated with bilio-gastric and nervous symptoms, the patient has no recollection of the attack—even though he may never have lost consciousness during the paroxysms. In more chronic cases the author distinguishes (a) retrograde amnesia, where the patient forgets not only recent events but also the occurrences of long-past years, even the things he learned at school; and (b) anterograde amnesia, where the patient cannot concentrate his attention, and may be in such a state of mental confusion that he cannot remember what he set out to do or say—perhaps cannot remember whether he has had his breakfast or not.

A. A.

Marchand (L.). **Tremblement consécutif à l'infection paludéenne.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Oct. 25. 3 Ser. Vol. 33. No. 27–28. pp. 1043–1045.

The patient is a soldier, 22 years old. There is a hereditary predisposition to tremor, but no evidence of any particular affection of the nervous system; no history of syphilis, or of abuse of alcohol, or of any antecedent disease of a serious kind. The tremors came on as a continuation of an ordinary febrile paroxysm two months after the first infection and lasted several days. They then became localised in the hands and arms and have persisted notwithstanding treatment. They cease during sleep, and when a malarial relapse occurs they are intensified and become general again.

A. A.

KAMAR (A. E.). **Malarial Mimicry.**—*Jl. Trop. Med. & Hyg.* 1917. Dec. 15. Vol. 20. No. 24. pp. 277–279.

Summary of two cases of sudden acute malaria of which the symptoms suggested in the one case acute mania, in the other cerebrospinal meningitis. In the first case, in which the most impressive symptom was violent delirium without fever, the diagnosis was established upon circumstantial evidence (history, enlarged spleen, and quick reaction to intramuscular injections of quinine); in the second case, besides the circumstantial evidence, subtertian parasites were present in the blood, and meningo-cocci were not found in the cerebrospinal fluid. The author draws the moral that in police cases in tropical towns, besides the recognised alternatives "drunk" or "fatal seizure," there is a *tertia sors*—sudden acute malaria—and he also thinks that a case of pernicious malaria with stuporous or melancholic symptoms and a normal or subnormal temperature might possibly be committed in haste to a lunatic asylum.

A. A.

MOREAU (Laurent). **Sur deux cas de gangrène du pied et de la jambe, ayant pour cause une artérite d'origine palustre.**—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 28–31.

The author refers to two cases of gangrene of the lower extremity, of malarial origin, reported by him in *Presse Medicale,* 22nd March, 1917, in order to emphasise the point that they were not symmetrical gangrene, but unilateral. He gives a full summary of both cases, and although he admits that malarial endarteritis may be rare in comparison with malarial thrombosis of arterioles, he is of opinion that his cases were the result of posterior tibial endarteritis directly due to malaria.

A. A.

LEGER & RYCKEWAERT (P.). **Hématozoaire de la fièvre quarte et accès pernicieux mortel.**—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 879–882.

Quartan fever being by general consent rarely malignant in character and usually tractable to quinine, the authors consider worthy of record a fatal case in their own experience. They state that the number of parasites in the peripheral blood was not numerous; and that post mortem many parasites were found in the bone-marrow, heart muscle, and brain; few in the lungs and liver; and hardly any in the spleen and kidneys. The globular resistance during the paroxysm was normal, and the coagulability of the blood was decidedly increased.

A. A.

WURTZ (R.) & VAN MALLEGHEM (R.). **Accès graves chez des paludéens atteints de tierce dite bénigne.**—*C. R. Acad. Sci.* 1917. May 14. Vol. 164. No. 20. p. 797.

Four Macedonian cases of benign tertian, confirmed by microscopic examination of the blood, in which cerebral symptoms were remarkably predominant. In three of them the symptoms were transports of delirium and loss of consciousness; in the fourth after oppressive vomiting the patient became cyanosed and unconscious. In no case could anything but *P. vivax* be discovered.

The authors also report that in a year's study of malarial cases from Macedonia, though at the beginning, from August to November, the parasite found in the blood of patients was usually *P. falciparum* and only in a few cases *P. vivax*, yet six months afterwards they could find only *one* case of *P. falciparum.* They ask if it is possible that *P. falciparum* becomes transformed into *P. vivax* in accordance with LAVERAN'S theory.

A. A.

BARTOLOTTI (Cesare). **Recidive malariche.** [Relapses in Malaria.]—*Riv. Crit. Clin. Med.* 1917. Dec. 15. Vol. 18. No. 50. pp. 501–506.

Notes of a case of pernicious malaria, with fatal termination in 4 days, in a soldier who had entered hospital for a gun-shot wound of the arm. The account of the autopsy shows no unusual features. The author, however, takes occasion to point out that an attack of malaria under such conditions is extremely likely to arouse misapprehensions of sepsis, which may lead to unfortunate surgical intervention. The microscopic examination of the blood should never be neglected in any case where there may be a possible suspicion of malaria. A feature of interest in the case was that the spleen weighed one kilogramme and the liver 1·8 kilogrammes, indicating old infection.

J. B. N.

LEINER (Carl). **Zur Klinik und Therapie der Malaria.**—*Wien. Klin. Woch.* 1917. Nov. 8. Vol. 30. No. 45. pp. 1415–1418.

A clinical account of cases from Albania treated at Vienna. Of 138, 120 were benign tertian. One case succumbed to a 0·9 gm. dose of neosalvarsan. The author says a permanent cure was rarely obtained; he gives no details of treatment.

A. G. B.

MACGILCHRIST (A. C.). **How to administer Quinine.**—*Indian Med. Gaz.* 1917. Oct. Vol. 52. No. 10. pp. 345–346.

The author states that the best way of administering quinine by the mouth to malaria patients is with or soon after meals, so that it will be dissolved by the acid contents of the digesting stomach. It does not matter much which salt is given; but the sulphate is the cheapest, and the hydro and bihydrochloride, besides being expensive, may in concentration do harm to a delicate stomach. Bile being an active solvent of quinine, a cholagogue (*e.g.* calomel) should prepare the way for the quinine in the intestine, where otherwise it is likely to be precipitated from solution. The author is of opinion—or, rather, leaves the reader to infer that it is consonant with his opinion—that the efficacy of Warburg's tincture is partly due to the fact that it contains three cholagogues whose undesired purgative properties are checked by its additional opium constituent. The author refers to some experiments with subcutaneous and intramuscular injections of quinine, but makes no positive recommendations. He also refers to intravenous injections, and expresses the opinion that large amounts of saline solution used in diluting the quinine for such injections cause useful diuresis and elimination of toxins. He also states, as S.M.O. of a brigade, that the preventive method in "attacks" of fever of keeping regimental registers of men in poor health and giving to each registered man a prophylactic dose of 15 grains of quinine, at night after the last meal, on two consecutive nights a week, was coincident with an insignificant number of malaria relapses.

A. A.

Rogers (Leonard). **Pernicious Malignant Tertian Malaria successfully treated by Quinine Acid Hydrobromide Intravenously and the Failure of "Splenox" in Benign Tertian Malaria.**—*Indian Med. Gaz.* 1917. Nov. Vol. 52. No. 11. pp. 385–386.

An epitome of two cases. In the first the patient was collapsed and not fully conscious on admission, and his blood was found to contain 46 malignant tertian parasites per 100 red cells; on the third day, after 3 intravenous injections of 1 gramme of acid quinine-hydrobromide in 10 cc. of water, no parasites could be found. The second case was a chronic benign tertian contracted originally in East Africa, and in the present relapse the patient had been taking "splenox" for 33 days, in full doses, without result; many parasites were found in the blood. On the fifth day, after an initial int avenous injection of 7½ grains of acid quinine-hydrobromide and 3 subsequent injections of 10 grains, the fever was broken and the parasites had dissappeared.

A. A.

Fox (Stephen C. G.). **Intramuscular Injections of Quinine Bihydrochloride in Simple Tertian Malaria.** [Correspondence.]—*Lancet.* 1917. Dec. 15. pp. 909–910.

The author very temperately questions Ross's condemnation of intramuscular injection of quinine. He states that in Perak they have reason to regard this as the decisive method in all obstinate and chronic forms of malarial fever. In one small hospital in Taiping whence exact records have been obtained, 672 such injections were given during the last 12 months, with only 4 accidents—abscess formation. The injection is made into the gluteal region, by a skilled hand. When the fever is under control the injections are stopped and quinine is given by the mouth.

A. A.

Griffin (W. B.). **Treatment of Malaria by Intravenous Injections of Quinine Urethane.**—*St. Bart. Hosp. Jl.* 1917. June. Vol. 24. No. 9. pp. 87–88.

Very strong testimony in favour of the intravenous method of giving quinine. The author says it was a fine sight to see men, who had been unconscious twenty-four hours before, keen on their breakfast; and that the nightround of the wards was an inspiration after the intravenous method had been adopted. The usual dose of quinine was 6 to 8 grains at one injection. In more than 100 cases the author did not see one bad symptom.

A. A.

STEPHENS (J. W. W.), YORKE (W.), BLACKLOCK (B.), MACFIE (J. W. S.), COOPER (C. Forster) & CARTER (H. F.). **Studies in the Treatment of Malaria. VI. Oral Administration of Quinine for Two Consecutive Days only in Simple Tertian Malaria.**—*Ann. Trop Med. & Parasit.* 1918. Jan. 31. Vol. 11. No. 3. pp. 283–307. With 25 charts.

Statistics and bare summaries of effects of the exact experimental treatment of seven series of simple tertian malaria cases where quinine was given by the mouth on two several consecutive days in a particular dosage of 5, 10, 15, 30, 45, 60 and 90 grains.

In the first series (5 grains) parasites did not disappear from the blood in 5 cases out of 30.

In the second series (10 gr., 10 cases) parasites disappeared in 2–3 days, parasitic relapses occurred in 10–18 days, and febrile relapses in 12–19 days.

In the third series (15 gr., 14 cases) parasites disappeared in 1–5 days, parasitic relapses occurred in 8–22 days, and febrile relapses in 12–25 days.

In the fourth series (30 gr., 14 cases) parasites disappeared (in 9 cases where the records are complete) in 1–4 days; parasitic relapses occurred in 7–20 days, and febrile relapses in 10–24 days.

In the fifth series (45 gr., 12 cases) parasites disappeared in 1–3 days (but in a single case of a double infection the *crescents* did not disappear); in 9 cases parasitic relapses occurred in 13–25 days and febrile relapses in 12–48 days; and in three cases there were no relapses up to the 50th day of observation—though in one of these cases malignant tertian parasites were found on the 25th day.

In the sixth series (60 gr., 12 cases) parasites disappeared in 1–4 days; in 7 cases parasitic relapses occurred in 11–27 days, and febrile relapses in 14–27 days; and in 5 cases there were no relapses in 61 days.

In the seventh series (90 gr., 76 cases) there was some irregularity of administration in certain cases, owing to vomiting, which had to be corrected by some intramuscular administration. In this series parasites disappeared in 1–3 days; parasitic relapses occurred in 29 cases and febrile relapses in 27 cases; but in 47 cases there was no parasitic relapse within an observation term of 53–165 days, and in 49 cases there was no febrile relapse within the same observation time.

The patients who received a dosage of 90 grains in one day were to some slight extent discomforted.

In all the series of cases the salt used was the sulphate, except in part of the first (5 gr.) series when the bihydrochloride was tried.

A. A.

MOULINIER. **Des injections de quinine. Avantages d'une solution récemment préparée et non bouillie.**—*Arch. Méd. et Pharm. Nav.* 1917. Nov. Vol. 104. No. 5. pp. 335–340.

The author contends that recently prepared. unboiled solutions are more active than those made up in sterilised ampoules and states that he has proved it in work previously published. His solution for injection is prepared with distilled water sterilised at 120° C. and is stored in sterilised vessels, not more than two days before use. Each cc. contains 0·25 gms.; his limit of dosage is 3 cc. in 24 hours. This solution succeeded where other preparations failed. Four cases are given.

A. G. B.

i. GIEMSA (G.) & HALBERKANN (J.). **Ueber das Verhalten des Chinins im menschlichen Organismus.** [The Behaviour of Quinine in the Human Body.]—*Deut. Med. Woch.* 1917. Nov. 29. Vol. 43. No. 48. pp. 1501–1502. *Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Nov. Vol. 21. No. 20–21. pp. 333–349.

ii. HARTMANN (Heinz) & ZILA (Loro). **Ueber die sogenannte Chiningewöhnung.** [The So-Called Quinine Habituation.]—*Münch. Med. Woch.* 1917. Dec. 11. Vol. 64. No. 50. pp. 1597–1598.

i. These authors discuss the recent papers by TEICHMANN and NEUSCHLOSZ [see this *Bulletin*, Vol. 11, pp. 21 and 25*]; the former concluded from his experiments that in the urine of quinine habitués less quinine was excreted than in persons were who not habituated, and that this lessened excretion was correlated with a lessened quantity in the blood available to act on the parasites; he sought to correct this by giving the drug intermittently in rising doses; the latter, who got better results by associating neosalvarsan and other arsenicals with quinine than with quinine per se, believed that the arsenical prevented the fixation or destruction of quinine in the tissues. The conclusions reached by Giemsa and Halberkann are to the following effect.—The method employed by TEICHMANN and NEUSCHLOSZ for the estimation of quinine in the urine—potassium mercury iodide—is not suitable as a quantitative test. As a qualitative test it is excellent; it never fails to show whether a patient has taken his daily dose of 0·8 to 1·0 gm. or not. For quantitative estimation the alkaloid must be isolated, for which they believe their own method to be sufficiently exact. Employing this they were unable to confirm TEICHMANN and NEUSCHLOSZ's conclusions that the excretion of quinine in the urine of quinine habitués and others varies in any regular manner. The hypotheses of these workers are not correct. Whether their therapy is of value clinical observation will decide.

ii. These authors, working in the Pharmacological Institute of the Vienna University, estimated the quinine excretion in the urine and the quinine concentration in the blood after a definite dose in a number of cases treated for six months with quinine. The quinine base was isolated by H. H. MEYER's method and weighed. The results of, in all, 27 such urine estimations in these persons and others who received quinine for the first time are shown graphically. The authors were unable to confirm that the excretion was diminished in the former class, and remark that it is subject to large fluctuations. Quinine cannot be estimated gravimetrically after 28–32 hours; not more than one per cent. is excreted after this period. The intensity of the mercury potassium iodide reaction as a measure of quinine excretion in the urine is not reliable, depending as it does on the degree of dilution of the urine. Similarly with the blood—they were unable to demonstrate that after prolonged use of quinine larger quantities of the alkaloid were destroyed. These figures are given in a table; they vary very little in the non-quinine habitués, quinine habitués and quinine habitués who had received the day before an injection of neosalvarsan.

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* In the last sentence but one of this summary for "destruction of arsenic by the tissues" *read* "destruction of quinine by the tissues."

A. G. B.

RAZZAK (Abdur). **Use of Quinoidine.** [Correspondence.]—*Indian Med. Gaz.* 1917. May. Vol. 52. No. 5. p. 179.

The writer has used quinoidine in 500 cases of malarial fever, and has found that 12 grains daily for four days "usually checks all ordinary cases of quotidian and tertian type." It does not affect the sensorium or cause depression so much as quinine. The writer is not certain whether the gastric irritation that occurs when it is given in solution, and the intestinal derangement that occurs after its prolonged use, are cause and effect or merely coincident.

A. A.

HATIEGAN (Julius) & DOERI (Béla). **Ueber die Behandlung der Malaria mit Optochin.** [Treatment with Optochin.]—*Wien. Klin. Woch.* 1917. Sept. 27. Vol. 30. No. 39. pp. 1230–1236.

The patients numbered 37, of whom 33 had benign tertian; all were old cases infected in Russia, the Balkans or the Adriatic. Basic ethylhydrocuprein was used in all cases but 5, which received the chloride. The dosage was 1–1·2 gm. daily, in two or three-hourly doses of 0·2 gm., repeated 3 or 4 times, and then every third or fifth day. The total amount was about 10 gm. in six weeks. In the benign tertian cases the parasites disappeared from the blood in 8–16 hours from the beginning of treatment. The conclusions reached were that given thus the drug was in no way superior to quinine; no symptoms in respect of the vision or digestive apparatus were noticed. In 21 cases, 20 of them benign tertian, the effect of the drug in suppressing relapses was tried. A brief account of 12 is given. Relapses always occurred, in spite of the fact that the patients were kept in bed or at rest. The authors discuss the difference in the results obtained by themselves and by IZAR and NICOSIA [this *Bulletin*, Vol. 3, p. 435], who found that this drug succeeded in cases in which quinine failed, without reaching a satisfactory solution. [For the most recent work see this *Bulletin*, Vol. 11. p. 23.]

A. G. B.

SCHILLING (Claus). **Malaria ; Selbstbeobachtung.** [Malaria ; A Personal Observation.]—*Deut. Med. Woch.* 1917. Nov. 8. Vol. 43. No. 45. p. 1415.

Dr. Schilling left Aleppo on November 12th and spent two nights in malarious places on the Amanus and Taurus ranges. Reaching Constantinople he took prophylactically on two successive days in each week 0·9 to 1·2 gm. quinine hydrochloride, continued for 3–4 weeks. On January 20th he left for Germany. On March 24th, 4 months after leaving a malarial region, he had a slight rise of temperature and two days later another rise, when the blood was found to contain tertian rings. He then began quinine in 1 gm. doses on the 6th and 7th days in each week till May 12th (48 days). Twenty days later he had an attack of malaria. He then decided to take 2 gm. of quinine in the day (in eight doses), lengthening the intervals to 9 days. His state, both objective and subjective, began at once to improve. Parasites have not since been found [? 5 months]. He thinks this dosage should be kept up for two months. Schilling agrees with TEICHMANN [this *Bulletin*, Vol. 11, p. 21], who gives large doses of quinine at infrequent intervals.

A. G. B.

MANAUD (A.). **Traitement des paludéens de l'armée d'Orient en France.**—*Presse Méd.* 1917. Oct. 18. Vol. 25. No. 58. pp. 599–601.

An excellent epitome of the therapeutic treatment of malaria, but not remarkable for anything new or original. The author believes in the periodic interruption of quinine treatment, and in the value of arsenical preparations as adjuvants to quinine ; and he considers intravenous injection to be the ideal method of administering quinine. He is also an advocate of prolonged treatment 3 grammes of quinine weekly for six months to a year after discharge from hospital.

A. A.

FALCONER (A. W.) & ANDERSON (A. G.). **Tartar Emetic in Treatment of Malaria.**—*Lancet.* 1917. Nov. 17. pp. 743–745.

Abstracts and records of 8 out of 12 cases in trial of Sir Leonard ROGERS's suggestion [see this *Bulletin*, Vol. 9, p. 306] for the treatment of chronic malaria by tartar emetic. Five of the 8 cases recorded were benign tertian, and in none of these five did the parasites disappear until quinine had been given ; but it may be remarked that ROGERS himself stated that tartar emetic does not seem to have much effect upon the parasites of benign tertian. Only 3 cases, therefore, supply relevant evidence : of these 1 was subtertian, and the other 2 were mixed tertian infections. In the pure subtertian case crescents disappeared after 3 injections of tartar emetic, but in spite of their disappearance and though no parasites of any kind could be demonstrated in the peripheral blood, the patient subsequently had three clinically typical attacks of malarial fever. In the two mixed infections the crescents disappeared, in one case after 4 injections of tartar emetic, in the other case after a single injection following 60 grains of quinine on the day but one antecedent; in the first case the coexistent benign tertian parasites persisted; in the second case, where quinine had been given to begin with, they disappeared.

In all the cases the tartar emetic was given in 2 per cent. solution with half per cent. carbolic acid, and the doses ranged from 1 to 4 cc.

The authors summarise their experience as disappointing and as not vindicating the tartar emetic treatment.

A. A.

SOTIRIADÈS. **Essais de sérothérapie dans la Malaria.**—*Grèce Méd.* 1917. July. Vol. 19. No. 13–14. pp. 27–28.

Latapas, an Athenian porter, aged 40, and given to drink, attracted the author's attention as an extraordinary case. Though for months his blood was full of crescents, his spleen was if anything contracted, his temperature fluctuated between 95·7° Fahr. and 97·1° Fahr., and he had no febrile paroxysms. His symptoms were those of Addisonian cachexia and debility, with most profound anaemia and deficiency of haemoglobin. Under quinine and tonics his anaemia became improved, but the crescents were not affected. It was thought by the author that Latapas serum might be used therapeutically, and an experiment was made on a patient who appeared to be suffering from a first infection. This patient had an enlarged spleen, fever, and ring forms in his blood, and nervous disturbances and profound debility were prominent symptoms. He was treated with a subcutaneous injection of 10 cc. of Latapas serum, kept upon ice after preparation, and not heated. Eight hours afterwards his temperature had fallen from 103·6° F. to 99·8° F. and all his nervous symptoms had gone. He remained free from fever for four days and then had a milder paroxysm of fever, which was broken in four hours by another injection of 10 cc. of Latapas serum. The following day he was given a third injection of the serum and 12 days afterwards, having been free from fever all the time, he left hospital.

A. A.

NETTER (Louis). **Résistance globulaire et paludisme.**—*Presse Méd.* 1917. Dec. 3. Vol. 25. No. 67. pp. 687–688.

Observations in 61 cases—24 normal and 37 malarial—including Europeans, Jews, Moroccans and other Africans. The technique followed and the experiments made are recorded. The conclusions are that increased globular resistance is a characteristic of a malarial fit, and that the severer the febrile fit the greater is the resistance; that *P. vivax* provokes less resistance than *P. falciparum*; that less resistance is manifest in chronic cases than in recent infections; and that large doses of quinine at the moment of the febrile fit still further increase and prolong the resistance, although the effect is not maintained. The last observation evokes a suggestion from the author that concurrently with quinine, or in the intervals between relapses, antihaemolytic remedies should be administered.

A. A.

NETTER (Louis). **Résistance des hématies déplasmatisées aux solutions chlorurées hypotoniques dans le paludisme.**—*C. R. Soc. Biol.* 1918. Jan. 12. Vol. 81. No. 1. pp. 43–44.

The author has abundantly confirmed his former observations that the globular resistance is increased during the paroxysms of malarial fever. He now further records the results of his observations on the resistance of red blood cells isolated from the plasma, in 4 cases of recent and 14 cases of chronic malaria, 3 of the latter being of the malignant type, observations which show that it is increased relatively to that of the blood intact. Quinine in large doses, particularly by hypodermic and intramuscular administration, increases this resistance still further: without quinine the increased resistance does not long outlast the paroxysm. In the 3 malignant cases this resistance was remarkably increased. In all the above cases the parasites specified were actually observed; but the author has also determined the resistance in malarial patients in whom parasites could not be demonstrated, and in all these it was little or not at all increased.

A. A.

CHATTON (Edouard). **La genèse des stigmates globulaires [taches de Maurer, grains de Schüffner] dans le paludisme. Leurs rapports avec l'amoeboïsme hémamibien. Leur faible valuer différentielle.** —*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 841-849. With 1 plate.

From critical examination of films fixed while wet in osmic acid vapour, and then stained in Giemsa 1 in 10 for half an hour, the author concludes that Schüffner's granules and Maurer's spots are two aspects of one phenomenon. In malignant tertian he observed the Maurer's dots to be in continuity with pseudopodia. In benign tertian the same Maurer's dots can be seen in the early stages; but they become very numerous, until they actually meet at many points and overlap to form a sort of network, and the stippling, or "Schuffner's granules," is the deeply-stained nodes of this network.

A. A.

APPEL (Leo). **Zur Färbetechnik der Malariaparasiten.** [The Staining of Malarial Parasites.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. Aug. 30. Vol. 80. No. 1–3. pp. 105–107. With 2 text-figs.

Elementary instructions for staining a film for malaria parasites. The author recommends, as simple, cheap, and excellent for diagnostic purposes, a stain of watery 1 per cent. methylene blue 1·5 cc. and alcoholic 1 per cent. fuchsin 0·28 cc., in 100 parts of distilled water. The film should be fixed in methyl alcohol, and stained for 15 to 20 minutes.

A. A.

STEVENSON (A. C.). **A Note on the Solubility of Malarial Pigment.**—*Jl. Trop. Med. & Hyg.* 1917. Dec. 15. Vol. 20. No. 24. p. 277.

The author, wishing to remove pigment that interfered with his examination of sections of pathological tissues from West Africa, found that ordinary acid-alcohol was efficacious. He also found that the same re-agent removed the pigment from malarial tissues and films. He points out therefore that acid alcohol should not be used when the demonstration of malarial pigment is desired.

A. A.

DE JONG (S. I.) & MARTIN (Arthur). **Paludisme et réaction de Bordet-Wassermann.**—*Presse Méd.* 1917. Oct. 25. Vol. 25. No. 60. pp. 617–618.

Commenting on the fact that the blood of malarial patients may give a positive Wassermann reaction apart from any suspicion of syphilis, the authors give an account of their own investigations of the subject; from which they conclude that the Wassermann (or Bordet-Wassermann) reaction retains all its diagnostic value for syphilis in malarial patients if the blood be not drawn at or near the period of paroxysm. It is always preferable to make duplicate observations, one with warmed serum the other with unwarmed serum.

A. A.

KIMURA (G.). **Wassermann Reaction in Malaria.**—*Taiwan Igakukai Zasshi* (*Jl. Formosa Med. Soc.*). 1917. May 28. No. 175. pp. 324–325.

[From Review by R. G. MILLS.]

This reaction is negative so constantly as to constitute a great presumption of complicating or latent syphilis in any positive case test. [See above, DE JONG and MARTIN].

A. A.

DERIVAUX (R. C.), TAYLOR (H. A.) & HAAS (T. D.). **Malaria Control: A Report of Demonstration Studies conducted in Urban and Rural Sections.**—*U. S. Public Health Bull.* No. 88. 1917. Sept. 57 pp. With 32 figs & 4 maps.

A well-illustrated and interesting description of experiments in malaria control in urban and rural areas.

The urban area selected was a lumber town, 165 feet above sea level, and having a population of 2,029, in south eastern Arkansas. The houses are fairly well screened, the streets are unpaved, the water supply comes from deep wells and is distributed in pipes, the sewerage is incomplete. Mosquito breeding-places are abundant—street-ditches, ponds, borrow-pits along railroad, and water-barrels. The local Anopheles is *A. quadrimaculatus.* In 1915, the year before control operations were undertaken, malaria comprised 22·4 per cent. of the total sickness; and in May 1916 when operations were started the parasite-index was 10·95 for white children and 7·25 for black children. Control operations started with a systematic survey in great detail, after which the breeding-places were systematically taken in hand. Old ditches were re-fashioned and cleared of vegetation, and new ditches were made. Borrow-pits were filled, or drained, or oiled. One pond was dealt with. Water-barrels were eliminated as far as possible, and where they were required for industrial purposes were treated with "soda-cake," a dilution of 1 in 400 being found sufficient. For oiling "fuel-oil" (a heavy crude oil) was used and was applied both by automatic drip-cans and by knapsack sprayers. Where oil could not be employed on account of fire risk a phenol disinfectant was substituted. The population was enlisted by lectures and lantern-shows. The total cost of all measures, including labour and inspection, worked out at $1. 23½ per capita.

As a result the number of Anopheles was very greatly reduced, and the reduction in malaria was estimated to be as follows:—

Reduction by parasite-index	72·33%
„ by comparison of total number of visits	70·39%
„ by comparison of total visits during malaria season	82·07%

The rural area selected was a typical cotton plantation area in south-eastern Arkansas, flat, with a mean elevation of about 130 feet above sea-level, prolific in vegetation, with a good deal of impervious soil and swamp, and a good deal liable to flooding from the Mississippi. The better-class houses had some protection against mosquitoes, but the huts of the tenantry had none. Sanitary arrangements were crude. The prevalent Anopheles was *A. quadrimaculatus.*

After a systematic survey control operations by screening and quinine were started, suitable educational measures also being carried out. For screening 16 mesh galvanised iron-wire cloth was used, the chimneys also being capped. Quinine was administered in 3 and 5 gr. capsules, and also as an emulsion in chocolate; it was employed in "immunising" quantities of 20 gr. per week for adults (proportionally reduced for children according to age), and in "sterilising" quantities of 10 gr. daily for 30 consecutive days for adults.

Control operations were arranged in two series. In one series houses were screened and quinine was given in "sterilising" quantities to proven carriers; in this series the reduction of malaria was estimated at 70·6 per cent., and the cost was $1.75¾ per capita. In the other series quinine was given in "immunising" doses to all, and in "sterilising" doses to proven carriers; here the estimated reduction in malaria was 64·45 per cent., and the cost $0.57 per capita.

Considerable difficulty was experienced in insuring that the quinine was actually swallowed, and not thrown away, or bartered, or hoarded.

A. A.

DERIVAUX (R. C.), **The Work of the U.S. Public Health Service with Reference to Malaria.**—*Southern Med. Jl.* 1917. June. Vol. 10. No. 6. pp. 472–478. With 1 map & 3 charts.

An unofficial summary of the anti-malarial operations of the U.S. Public Health Service in the 11 south-eastern states of the Union. The subjects investigated include incidence and distribution of the disease, endemic indices, incidence of specific types of malaria, influence of drainage projects, influence of waters "impounded" for industrial purposes, influence of rice-cultivation, etc.; and the further departmental operations include malaria mosquito surveys, systematic biological and other experiments in the laboratory, and popular instruction by means of lectures and demonstrations. A tribute is paid to the memory of the late Surgeon R. H. von EZDORF, by whom this branch of the service was most brilliantly initiated. The author naturally does not emphasize the point—but it is as well for the interested spectator to lay it to heart—that in conducting an investigation (of the prevalence of malaria) by the circular post-card method the replies received ranged from 8·63 per cent. to 20 62 per cent. of the circulars distributed.

A. A.

DE GOYON (J.) & BOUVIER (J. E.). **La lutte antipaludique dans un régiment d'Infanterie coloniale en Orient, 1917.**—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 886–890.

Antimalarial procedure followed in the summer of 1917 with an infantry regiment in Macedonia. The prevalent mosquito was *A. maculipennis*, of which 4 per cent of the captures in September were found to be infected.

Stagnant pools were drained, and marshes were oiled. Mosquito-nets and veils were adapted to requirements, the service patterns supplied not being quite approved. Culicide pomades, etc., were not used, as the men disliked them. Huts, etc., besides having all entrances protected, were daily purged of any flies that had got in. From April onwards to June a daily ration of 0·4 gm. quinine was distributed, and after June was increased to 0·6 gm. Towards the end of summer the men became very keen on their quinine, being fully convinced of its efficacy. Latterly the native inhabitants of the locality were removed, and detachments of the regiment were stationed in the neighbouring hills. All malaria patients were treated in especially isolated pavilions. Each case, after confirmation by microscope, received immediately an intra-gluteal injection of 1·5 gm. of quinoform, and during the first week three similar injections.

The total number of men treated, from April to October, was 226, of which 142 seemed without doubt to be new infections on the spot. Of the 226, 55 had a relapse during the month succeeding treatment, 1 had three relapses, and 170 did not relapse. 284 blood examinations were made, of which only 89 were positive; of the latter, 50 showed *P. vivax*, 28 *P. falciparum* and 11 young indeterminable forms.

A. A.

ROCHE (Maurice). **The Prophylaxis of Malaria.**—*Indian Med. Gaz.* 1917. Oct. Vol. 52. No. 10. pp. 349–351.

This writer asserts that malarial fever can be prevented by 5 grains of quinine sulphate taken daily at 5 p.m. He produces a good deal of hearsay in support of the statement; but the evidence that he regards as conclusive, in his own experience, is that three officers who took quinine in the way specified during the malaria season of the extremely malarious Rufigi basin in E. Africa escaped infection, when all the other Europeans, all the Indians, all the extraneous camp-followers, and many of the indigenous Africans became infected. Unfortunately he does not say whether these three officers were the only individuals in the whole force who took quinine, nor does he furnish any further particulars about these officers, except that they acted independently; so that although his experience is interesting it does not satisfy all the requirements of an experimental induction.

A. A.

DOFLEIN (Franz). **Ueber mazedonische Anophelinen und ihre Bedeutung für die Verbreitung der Malaria.** [Anophelines in Macedonia and their Rôle in the Spread of Malaria.]—*Münch. Med. Woch.* 1918. Jan. 1. Vol. 65. No. 1. pp. 17–18.

Anophelines are found throughout the warm weather in Macedonia in great numbers, though in the long hot summer all the pools dry up. Water is however found on the hills and their slopes. *A. maculipennis* Mg. and *A. superpictus* Gr. are the species. The former is the commoner and the usual malaria carrier. *A. superpictus* was found in some places in great numbers, especially in the Vardar valley. It breeds not only in pools and rain casks, but also in the brooks of the gullies which are characteristic of the Macedonian formation, where the larvae are found in the running water as well as the stagnant pools, keeping close to the stony margins. Lazarets which were placed near such brooks, in the belief that Anopheles do not breed in running water, were attacked by malaria. The only instance of such occurrence of which the author is aware is that of *A. maculatus* in Malaya (Malcolm WATSON) [but other species are known to breed in running water where there is floating vegetation to protect them].

A. G. B.

COT & HOVASSE. **Quelques remarques sur les Anophélines de Macédoine.** —*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 890–896. With 1 text-fig.

Three species of Anopheles have been observed in the neighbourhood of Salonica, namely *A. maculipennis*, *A. superpictus* var. *macedoniensis* and *A. bifurcatus*; the last being rare. The two first are the principal malaria carriers of the locality: eight per cent. of the specimens captured, mostly at Mikra, were found to be naturally infective.

A. A.

VOGEL (R.). **Bemerkungen über das Vorkommen von Anophelesmücken in Pferdeställen und über die Vertilgung von Anopheleslarven.** [Remarks on the Occurrence of Anopheles in Stables and the Extermination of Larvae.]—*Münch. Med. Woch.* 1917. Nov. 13. Vol. 64. No. 46. p. 1509.

A note evoked by the dictum of FÜLLEBORN that Anopheles are found in byres but not in stables. The author found them often in the latter situation on a part of the Western Front; from dark unclean stables of wood construction they were never absent. He exterminated them over a small area by enticing them to ovulate in fire buckets, the water in which was then covered with a layer of saprol.

A. G. B.

INGRAM (A.). **A Key to the Species of Anopheles occurring in the Gold Coast.**—*Report of the Accra Laboratory for the Year 1916.* 1917. London: J. & A. Churchill. pp. 83–86. With 3 plates.

The author gives a key and brief diagnosis of the 12 species of Anopheles that occur in the Gold Coast. The key is adapted from EDWARDS' key of African species published in the *Bulletin of Entomological Research,* Vol. 3, pp. 242–245, and the supplementary diagnoses are much to the point.

A. A.

GENUARDI (G.). **La malaria a Brindisi e nei dintorni.** [Malaria at Brindisi and its Neighbourhood.]—*Ann. Med. Nav. e Colon.* 1917. July-Aug. Year 23. Vol. 2. No. 7–8. pp. 625–634.

The outbreak of war brought a large number of soldiers and sailors to Brindisi with a corresponding augmentation in the amount of malaria. Tables are given for the three years 1913, 1914 and 1915 showing the increase. In August 1915, there were 1,149 cases of malaria, of which 261 were in civilians and 888 among the military.· For the corresponding month of 1914 the number of cases had been only 12, and for 1913, 30 The embarrassment caused to the medical authorities can be imagined. All the usual methods for counteracting the scourge were taken.

J. B. N.

GALATA (G.). **Campagna antimalarica 1916 alla "Difesa marittima di Grado."** [Antimalarial Measures in 1916 in the Maritime Post of Grado.]—*Ann. Med. Nav. e Colon.* 1917. July-Aug. Year 23. Vol. 2. No. 7–8. pp. 597–624.

The district under consideration has an area of about 100 square kilometres, half consisting of permanent lagoon, while the remainder is composed of marsh and reclaimed land. The anti-malarial measures taken were of the usual kind, and are described in great detail. 94 cases of malaria were observed, of which 68 were of benign, and 26 of malignant, tertian. There was one death. The district is under military occupation.

J. B. N.

MELTZER. **Häufigkeit und Art der Chininexantheme.** [Quinine Rash: Its Frequency and Description.]—*Münch. Med. Woch.* 1918. Jan. 1. Vol. 65. No. 1. pp. 20–21.

From April to November a regiment of 3,200 men received prophylactic quinine, 0·3 gm. daily increased to 0·6 gm. twice a week [no further details]. Only 4 cases of quinine rash were seen, 2 of which were in officers. It was measles-like and thicker on the limbs than on the trunk. There was itching and oedema of the hands and feet and in one instance oedema of the face.

A. G. B.

LABADENS. **Note au sujet du traitement du paludisme.**—*Arch. Méd. et Pharm. Nav.* 1917. Nov. Vol. 104. No. 5. pp. 332–335.

There is nothing novel in this paper. The author expresses decided opinions, being incited, possibly, by the fact, as he says, that in the subject of malaria so many new discoveries of the well-known are being made nowadays.

A. A.

MEMMI (Guglielmo). **Norme per la cura e profilassi chininiche della malaria nell'adulto.** [Rules for the Cure and Prophylaxis of Malaria in the Adult with Quinine.]—*Riv. Crit. Clin. Med.* 1918. Jan. 12. Vol. 19. No. 2. pp. 22–24.

A set of rules for the administration of quinine in the treatment of malaria in its various forms in the adult. They conform generally to the rules given in the text-books, which, as is known, always vary to a certain extent according to the personal experience of the author

J. B. N.

AUFRECHT-Magdeburg. **Die Therapie hartnäckiger Malariafälle.** [Treatment of Obstinate Malaria.]—*Berlin. Klin. Woch.* 1917. Oct. 29. Vol. 54. No. 44. pp. 1055–1056.

A short note in which the author, on an experience of 5 cases, recommends as a specific a formula for quinine and arsenic pills.

A. G. B.

HUELSE (W.). **Leukocytenblutbild und Fieber bei Malaria.** [The Leucocyte Blood Picture and Fever in Malaria.]—*Berlin. Klin. Woch.* 1917. Oct. 8. Vol. 54. No. 41. pp. 982–984. With 1 chart.

An intensive study of a few hours of a single case. A table is given showing the variations in percentages of 9 varieties of white corpuscles at 8 times between 10.0 a.m. and 5 30 p.m. with the corresponding temperatures, and a chart gives similar details of the uric acid and purins excretion and of the Arneth count.

A. G. B.

HIRSCHFELD (L.). **Ueber ein neues Blutszmptom bei Malariakrankheit.** [A New Blood Symptom in Malaria.]—*Correspondenz-Blatt f. Schweizer Aerzte.* 1917. Aug. 4. Vol. 47. No. 31. pp. 1007–1012

The author finds that in the oxalate blood of malarial anaemics the red cells sink at a rate nearly in direct correspondence with the degree of anaemia. Oxalate blood is a non-clotting mixture of 9 parts blood and 1 part one-per-cent. No oxalate. As the author admits that the phenomenon is common to *all* forms of anaemia, it is not clear why he should suggest by the title of his paper that it has any peculiar diagnostic significance in malaria.

A. G. B.

FRAGA (Clementino). **Suprarenal Syndrome in Paludism.**—*New Orleans Med. & Surg. Jl.* 1917. Nov. Vol. 70. No. 5. pp. 443–445.

The author states that he has observed the symptoms of suprarenal insufficiency in two cases of malaria, and that until he read the papers of MM. PAISSEAU and LEMAIRE he thought his observations were novel.

A. A.

Léger (L.) & Mouriquand (G.). Sur la répartition des stations d'anophèles dans le secteur médical Grenoble-Gap-Briançon et indications prophylactiques qui en découlent.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Jan. 18. 3 Ser. Vol. 33. No. 1–2. pp. 16–22.

The authors define various *Anopheles* stations in the French Savoy region and discusses their significance from the malarial standpoint.

A. A.

de Massary (E.) & Tockmann. Un cas de paludisme avec réaction méningée violente, simulant la méningite cérébro-spinale.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Dec. 13. 3 Ser. Vol. 33. No. 33–34. pp. 1195–1200. With 1 chart.

A detailed account of a case in which but for the enlarged spleen, the presence of malaria-parasites in the blood, and the reaction to quinine, the symptoms would have suggested cerebro-spinal meningitis.

A. A.

Labbé (Marcel). Le foie des paludéens.—*Bull. Acad. de Méd.* 1918. Jan. 15. 3 Ser. Vol. 79. Year 82. No. 2. pp. 54–55.

A short dissertation on hepatic derangement in recent malarial infection. The author states, *inter alia,* that he has never observed the reaction of acidosis in recent infections.

A. A.

Montez (Julio). Os arrozaes e a malaria. [Rice-Fields and Malaria.] —*Med. Contemporanea.* 1917. Dec. 9. Vol. 35. No. 48. pp. 377–378.

The author, who is a district medical officer of health, enters a vigorous protest against the extension of rice-culture in Portugal. Formerly in his district there was but little malaria, and that of a benign type. Since the introduction of rice-fields and irrigation the amount of malaria has greatly increased, and the subtertian form has become common. No figures of any kind are given.

J. B. N.

Lehotay (Karl). Zur Diagnose und Behandlung der Malaria tropica. [Diagnosis on Treatment of Malaria.]—*Deut. Med. Woch.* 1918. Jan. 17. Vol. 44. No. 3. pp. 62–64. With 2 charts.

The author lecturing from some months' experience of malaria among troops in Albania fixes his attention upon "the scheme of temperature" which he would make the basis of a scheme of treatment.

A. A.

Blanc (G.). Au sujet du Paludisme autochtone de la région du Lac Presba. (Note complémentaire.)—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. p. 804.

A note confirming the existence of indigenous malaria in the country west of L. Presba in Albania, as observed and recorded by Dr. Lamoureux [see this *Bulletin,* Vol. 11, p. 11].

A. A.

GALLI-VALÉRIO (B.). **La distribution géographique des Anophélines en Suisse au point de vue du danger de formation de foyers de malaria.** [Extract from *Bull. du Service Suisse d'Hyg. Pub.* 1917. Oct. 6 & 13. Nos. 39 & 40. pp. 440 & 453.]—*Bull. Office Intern. d'Hyg. Publique.* 1917. Dec. Vol. 9. No. 12. pp. 1566–1582.

This is a valuable report, but except as an example to the world it is only of local interest. It gives in much detail the situations of breeding-places of *Anopheles maculipennis* and *bifurcatus*, so far as the author has been able to investigate them, in the several cantons of Switzerland, with a view to charting the possible malaria-centres of the country.

A. A.

BOOK REVIEWS.

FISCHER (J. C. H.). **Maatregelen tegen Malaria.** [Prevention of Malaria.]—xii + 176 pp. With 14 plates. Koloniaal Instituut te Amsterdam. Mededeeling No. 10. Afdeeling Tropische Hygiene No. 5. 1917 Amsterdam: J. H. de Bussy. [Price fl. 2.00.]

The author, a retired Major of Engineers, Dutch Indian Army, has a full knowledge of his subject and exposes it in such clear and simple language that the reading is easy and pleasant; technical terms, pure science, treatment, being purposely left to the doctors. Being well up to date the book is extremely useful to settlers in any part of the tropics, who in any circumstances could fall back upon it, and find advice, if not to suppress the mosquitoes, at least to reduce their numbers in such a way as to render the place habitable.

The subject matter is divided into six chapters, and these into sub-chapters—sections, etc., the titles of which are repeated "in margina." The various methods proposed are abundantly illustrated with examples of their application in various colonies, some failures being explained in order to make the reader plainly understand how, or how not, to work.

The Introduction gives a short definition of malaria, the means of transmission and the importance of the disease for the general population, the army and labourers. In Dutch India the incidence of malaria, which is rather high, is 39·8 per cent. of the general total of diseases; yet the mortality is only 7·3 per cent. of the total deaths in the district of Mangga Besar (Batavia), which is taken as an example.

In Chapter 2 we have a brief description of the mosquitoes—life, habits, etc., in general, and of the Anophelines in particular, with nomenclature of the South-East Asian species.

The anti-malaria measures *in Chapter* 3 are divided into three sections:—

(a) *The destruction of the parasite in man*, which is left to the medical man.

(b) *The destruction of the mosquito* (1) by hand killing, traps, fumigation by tobacco fumes or chemicals.

(2) The author gives a good and methodical description of the various relations between land and water, and how to deal with them by filling up and draining. Colmatage, or warping, employed in India, Dutch India, Italy and the South of France as a means to raise the ground is described in some detail. The process is very slow and at first always increases the malarial index, but it may be of use for big stretches of country. One would have liked the author to describe here the quick method (in which the Dutch are masters) for raising ground along rivers. They employed it at Galveston to raise the ground several metres, and on the left bank of the Scheldt at Antwerp. In many colonies dredgers have to be used to keep open a channel for navigation, the extracted slime being very cumbersome, but with the aid of a pump and big drains, it can be spread over the lowlands for a fairly long distance and at very little additional expense, and the ground thus treated can be used for cultivation or building purposes.

The description of drainage is very complete and so well illustrated that, without more ado, a settler could start and drain his own land successfully. Where drainage or filling up is not possible oil is employed.

(c) (1) *Protection of the Individual* by veils, gloves, boots, mosquito nets and mosquito proof rooms and buildings.

(2) *Protection of the Community* by avoiding dense population in a restricted area; by separation of white and coloured races; by choice of ground for the building and extension of towns—villages—compounds, and barracks; by metallic netting of the latter, useful hints being given as to its duration.

So far the *complete* separation of the white population from the natives has been accomplished only in one case, at Duala at the mouth of the Cameroon River, West Africa. For the white population 400 strong, 800 acres have been reserved round which is a belt about 5 miles long and 1,094 yards broad. Native buildings are only allowed outside these limits. Existing dwellings have been destroyed, or removed. The natives did not appreciate this general removal, and politically, such extreme measures are not always advisable, as they create the feeling that the white is cared for at the natives' cost. With this the reviewer fully agrees, but we all know how little the Germans have to say in their own country, leave alone natives in a German colony.

In Chapter 4 Major Fischer considers malaria in connection with agriculture, especially the cultivation of rice in Tonkin, Federated Malay States, British Guiana, the Andamans, Surinamo, Dutch India Colonies and in Italy. The breeding of the mosquito in the marshy soil and malarial infection are not proportional and want further investigation.

Cattle and fish breeding are also mentioned, as is the influence of big works where considerable parts of the soil are disturbed. The following chapter, not less important, gives the principles of anti-malarial measures, the education of the population, propaganda, and the part played by Government.

In Italy the sale of quinine is a State monopoly with fixed maximum prices, its distribution for prophylactic and curative use being free to all labourers, and chargeable to the employer, while death due to malaria leads to compensation.

As a conclusion to this excellent little book, the author gives examples where anti-malarial measures have met with striking success :—

(1) In the Beni-Ounif Oasis (Algeria), the malarial infection falling from 85 per cent. to 3·7 per cent. (2) In the Island of Formosa, from 272·4 per cent. in 1897 to 51·2 per cent. in 1907. (3) In Ismailia town, the number of cases falling from 1,800 in 1885 to 55 cases in 1905.

In an Addendum we have an alphabetical list of 119 books, reviews, etc., consulted.

J. A. Beels.

MANSON (Sir Patrick) [G.C.M.G., M.D., LL.D. (Aberd.)]. **Tropical Diseases. A Manual of the Diseases of Warm Climates.**—xxii + 968 pp. With 12 coloured & 4 black & white plates & 254 text-figs. 6th Edition. 1917. London, New York, Toronto & Melbourne: Cassell & Co., Ltd. [Price 16*s.* net.]

The new Edition of "Manson" will be generally welcomed. Manuals of a group of diseases the knowledge of which is continually being increased tend to get out of date in 19 years notwithstanding periodical corrections and additions, and these are likely to upset the balance of a book, but here the additions have been, in nearly all cases, interwoven with skill so that the merits of the work published in 1898 have not suffered detraction from the changes in five subsequent editions, nor has the book become unwieldy. Twenty-eight pages of text have been added and 15 fresh figures, the latter chiefly in the Helminth section and illustrating recent work on schistosomiasis, the importance of which, with CLELAND, BRADLEY & McDONALD'S demonstration of the insect vector of dengue in Australia, is mentioned in the Preface. Pellagra quits the "Fevers" section—one wonders how it got there—and appears, with beriberi, under Diseases of Undetermined Nature. A new chapter is headed "Ackers Poisoning," wherein Dr. Harold SCOTT'S discovery of the cause of Vomiting Sickness of Jamaica is recognised; this however is the only form of food poisoning that is described.

In any textbook of tropical medicine some errors and omissions may be detected by a critical reader but here, as far as the reviewer is able to judge, the errors and notable omissions are few; and indeed with so many revisions most have by now been rectified. To take the subject with which the reviewer has some familiarity, PLIMMER and THOMSON (not Thompson) carried out their experiments with *T. brucei*, not *lewisi*, and *Glossina palpalis* occurs in Rhodesia as well as *G. morsitans*—on Lake Mweru, the south end of Tanganyika, and rivers connecting with these lakes. In an account of "the best known and most important" trypanosomes of mammals we do not find *T. vivax,* which surely has a large literature and is more important, because more pathogenic, than *T. theileri.* The plate of *G. palpalis* gives a wrong idea of its colour; the fly appears as brown rather than black, its most striking character in nature. AUSTEN'S "Handbook of the Tsetse Flies" contains a much better representation by the same artist.

In the account of the African type of tick fever one misses that common symptom, facial paralysis, fortunately transient; the reviewer remembers an unhappy Indian in whose case it was double. Under the diagnosis of yellow fever would it not be well to mention that this disease and malaria may co-exist? Is the recommendation to the European to wear non-actinic colours, "a red or yellow shirt or a fabric into which these colours enter," based on any reliable experience or experiment? One fancied that it had received its coup de grace in the Philippines. From the retention of the three figures of Simulium in the chapter on pellagra it would seem that the author has not given up Dr. SAMBON'S belief of its insect transmission, but other views are given. The confusion attending the name of the Entamoeba of dysentery is witnessed by the fact that it is introduced as *E. tetragena,* though the more general *histolytica* is also used.

The chapter on the schistosomes has probably suffered more change than any other. LEIPER'S work is described and several of his figures are reproduced. The form *Schistosomum* is used for the genus; should not this be *Schistosoma*? In this connection it may be noted that according to the International Official List of Generic Names drawn up by the International Commission on Zoological Nomenclature the genus *Ankylostomum* (as here written) becomes *Ancylostoma.* It is to be hoped that Sir Patrick Manson and other authors of textbooks will fall into line with the zoologists. Misprints are very few; the reviewer met with one only of importance. On page 295 it is stated, "Experiments by ASHBURN and CRAIG . . . seemed *to show that the germ of dengue . . . is ultra*-microscopic and therefore unfilterable." Presumably "filterable" should be read.

One puts down the book with the feeling that of textbooks on Tropical Medicine others may contain more information and be more useful in the encyclopaedic sense, but as a readable, judicious and well digested, as well as handy, account of the diseases with which it deals, and above all as an introduction to the subject, "Manson" remains without a rival.

A. G. B.

WENYON (C. M.) & O'CONNOR (F. W.). **Human Intestinal Protozoa in the Near East. An Inquiry into some Problems affecting the Spread and Incidence of Intestinal Protozoal Infections of British Troops and Natives in the Near East, with Special Reference to the Carrier Question, Diagnosis and Treatment of Amoebic Dysentery, and an Account of Three New Human Intestinal Protozoa.** [Conducted under the Auspices of the Medical Advisory Committee, M.E.F. (January to August, 1916).]—218 pp. 1917. London: Published for the Wellcome Bureau of Scientific Research by John Bale, Sons & Danielsson, Ltd.

This book consists of four parts and an Appendix. The four Parts were published in the *Journal of the Royal Army Medical Corps* (Nos. 1–6, Jan. to June, 1917) and their content has been noted in this *Bulletin.* The Appendix is here printed for the first time; it contains the case reports, with charted findings, of patients treated for *E. histolytica* or flagellate infections. The book is well got up, is indexed, and is obviously a valuable record of work.

A. G. B.

DANIELS (C. W.) & NEWHAM (H. B.). **Laboratory Studies in Tropical Medicine**—xv + 560 pp. With 6 coloured plates, 164 figs. & 7 charts. Fourth Edition. 1918. London: John Bale, Sons & Danielsson, Ltd.

With reference to the review of this work by Prof. J. W. W. STEPHENS, Liverpool School of Tropical Medicine, which appeared in No. 3 (March) of this *Bulletin* C. W. DANIELS, M.B., F.R.C.P., writes as follows:—

"As this review is signed it merits some notice, though I think the practice of many editors of sending marked copies from the Editor is worthy of imitation but this review I have seen through the kindness of a friend.

"The main points seem to be to disparage the methods adopted at the London School of Tropical Medicine and a comparison of these with those followed in Liverpool, e.g.; the reviewer objects to the method of making blood films, the length of time taken for fixing, and the method of staining. As the object of these is to have good films and avoid as far as possible the breaking up of the more delicate elements in the blood, and secure good fixation and clean staining, I do not advocate other methods; and as the reviewer complains that sufficient attention is not paid to 'deceptions' common in other methods, rare in these, I consider that these attempts to avoid them are worth the trouble, and the methods we recommend are those in our opinion least likely to lead to disappointment and 'deceptions.' He recommends acetic acid preparations for dehaemoglobinising thick blood films and objects to the insufficient time (when dry) advocated. When thoroughly dry accidents rarely happen if plain water is used, but would with acetic acid preparations.

"We do not lay any stress on graphs of the lengths of trypanosomes, but we do not place much reliance on results of inoculation experiments, as in one of the cases infected with *T. rhodesiense* seen by Professor STEPHENS and myself rats lived for weeks after inoculation instead of, as in others infected from different sources with *T. rhodesiense*, some 8–10 days. Probably as in so many other things degree of pathogenicity can only be considered as a point in diagnosis and in separating species.

"As regards bacteriology, we do not claim this as a text book of that subject, nor do we as one of Entomology, Helminthology, etc.; nor do we compete with them, but we do consider that there are some special points which may be of value to tropical laboratory workers.

"The importance of Bacteriology in Tropical Medicine is valued differently by many authorities as indicated by examinations for Diplomata in Tropical Medicine. Cambridge includes some Bacteriology, Liverpool excludes it and diseases due to bacteria; the Conjoint Board insist on candidates passing in Bacteriology before they take the rest of the examination.

"I admit there are difficulties and am ready to adopt other methods when they are shown to be superior, but I do not agree that the inaccuracy of counting massed groups of leucocytes as seen at the sides and ends of a film, justifies the use of these in counts, though it would save time. In 1892 when I was working with Eosinophilia in Ankylostomiasis, I had to abandon the use of these parts of the film, and when I first saw in COLES' 'Blood' (1st edition 1898), the statement of the increase in large mononuclear elements in malaria, I doubted the statement, as he did not lay stress on the variable counts according to the part of the film examined. To use as an argument for the use of these parts of the film because there the most numerous leucocytes are found and doing so saves time and trouble, does not seem to me sound as different results are obtained if these parts of the film are used.

"I am prepared to admit that parts seem too elementary, but that is because we find that many of our students desire elementary instruction even in such matters as making blood films.

"General medical education is improving and we have hopes that soon, though not yet, we shall be able to weed out much that will not then be required and add others, but I doubt if these should include differences in the male genitalia of insects as a specific point of discrimination of species. This is a point rather in the department of pure Entomology."

The custom of the Bureau has always been to send a copy of the number containing a book review to the publisher who, it is presumed, would acquaint the author with the contents of the review. Undoubtedly in this instance a copy should have been addressed to Dr. DANIELS and the omission is much regretted. [ED.]

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 11.] 1918. [No. 5.

APPLIED HYGIENE IN THE TROPICS.

By Colonel W. G. King, C.I.E., I.M.S. (Retired).

REPORTS.

Korea, 1915–16.

The Governor General of Chosen (Korea) has issued his Annual Report for 1915–16, from which it is evident that rulings have been put in force which should bring the area in his charge well to the front as an instance of sanitary progress in the East. At a recent Census, the population of Chosen was found to amount to 16,278,449; of which 15,957,630 were Koreans, 303,659 Japanese and 17,160 foreigners.

Notification is demanded for cholera, typhoid, typhus, bacillary and amoebic dysentery, smallpox, scarlet fever and paratyphoid. "In control of these diseases, the police have authority to enforce partial or complete quarantine of houses, neighbourhood or city as the conditions demand. . . . Geisha girls, public prostitutes, waitresses or inmates of questionable restaurants are retained under definite police survey."

The total deaths for the year are not stated, but from an analysis afforded of cases and deaths from notifiable diseases in which there had occurred failure to report, it is ascertained that cholera, diphtheria, typhus, typhoid, smallpox, and dysentery prevailed during 1915–16. If failure to report be in some sense a gauge of frequency, it would appear that typhoid and paratyphoid divide with dysentery precedence in death causation. Accepting the same uncertain test, the Japanese were much more severely affected with typhoid and paratyphoid than the Koreans, in proportion to the respective populations.

Sanitary Associations to the number of 986 exist in rural areas, to which are assigned Municipal functions. They are supported by local taxation.

Ten cities are now supplied with public water works and two more systems are under construction. Slaughter-houses are under police supervision and unsuitable meat is rejected. [In his reference to this subject, the Governor General states that the "Koreans are heavier meat eaters than the Japanese."]

Veterinary conditions are under special rulings—embracing control of epizootics.

Considerable expenditure is entailed in affording medical care of the population by means of a Government General Hospital at Seoul and 18 Provincial Charity Hospitals. Itinerating physicians are also provided. For leprosy a leper hospital exists in Shoroku Island.*

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* From a summary by Dr. R. G. MILLS.

DISEASE PREVENTION.

MALARIA.

Drainage and Agriculture as Anti-Malarial Measures.

Bengal.—In a Sanitation Number of this *Bulletin* [Vol. 7, No. 7, June 30, 1916, p. 405] it was pointed out that agriculture is the ally of sanitation in that drainage ensures that aeration of soil which is essential to healthy plant growth, and at the same time secures that absence of surplus moisture which is favourable to mosquito breeding. Further experiments by the Agricultural Department of the Government of India, as reported in the "Quarterly Agricultural Journal," again suggest very definitely the direction in which by co-operation the sanitarian and agriculturist may best protect both the economic and sanitary interests of populations from the malign influence of malaria. *Indian Engineering* (Calcutta) of Sept. 29, 1917 [p. 170], in an article dealing in detail with the researches made by the Indian Agricultural Department, affords the following extract from the published Report* :—

> "All the facts so far obtained fit into the aeration theory and we have come to regard the surface layer of the alluvium [Indo-Gangetic] as a vast oxygen filter separating the atmosphere from the subsoil water which, analysis shows, is particularly poor in dissolved oxygen. All soil-aerating agencies, like surface and subsoil drainage, at once increase production provided the supply of organic matter in the soil is adequate."

After many years of hesitation as to what particular method should be adopted for combating malaria in Bengal, it would appear from the following telegram by Reuter (if the word "drainage" is to be accepted in its usual interpretation) that the Local Government of that Presidency is about to embark upon an anti-malarial measure of no mean order, in which drainage assumes its correct place as the great co-ordinating factor of agriculture and sanitation :—

"*Fighting Malaria in Bengal.*"

> "Calcutta. Jan 29 (delayed). In announcing to-day new drainage projects of several hundred square miles in the fever-stricken districts of Bengal, Lord RONALDSHAY, Governor of Bengal, said that the grim tragedy of malaria was causing annually 350,000 deaths and 200,000,000 days of sickness in this Presidency alone.
>
> "The present schemes, he added, were mainly anti-malarial, but they were also expected to increase the crops. One of these schemes had already been completed, and was now yielding an annual profit of more than a hundredfold."—Reuter.

British Guiana.—In a paper read before the Society of Tropical Medicine and Hygiene in November 1917, Dr. A. T. OZZARD, Government Medical Officer, British Guiana, discussed as one of the "Sanitation Problems of the Sugar Estates and Villages of British Guiana," this question of the relation of agriculture to malaria.† He stated that Malcolm WATSON "maintains that in a flat country such as British Guiana malaria should be effectually extinguished by cultivation alone." With this opinion he does not concur and supported his attitude by stating:—

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* Agricultural Research Institute, Pusa.

† *Trans. Soc. Trop. Med. & Hyg.* 1917. Vol. 11. No. 2.

> "I know of no single estate in the Colony on which it can be said that malaria is non existent, not even for all practical purposes. . . . Speaking generally, the estates which are along the coast line have a much less malaria incidence than those which border on the banks of the big rivers. And yet . . . every one of them—coast or river estates—adopts precisely the same methods of cultivation and drainage. Why there should be such a difference, so far as malaria and health conditions generally are concerned, between the estates along the coasts and those along the river banks is one of the problems to be tackled."

He thus describes the method of drainage pursued [p. 72]:—

> "This [drainage] so far as British Guiana is concerned, is a very important matter. The sugar estates, and indeed the only inhabited parts of the colony, are either situated along the coast-line or, for a very few miles, along the banks of the three big rivers of the colony. All this portion of the land, and for many miles inland, is perfectly flat, so that there is no natural drainage of any kind. The sugar-cane plant cannot thrive unless the land in which it is grown is exceedingly well drained. To attain this object a system of sluices and so-called 'kokers' are depended upon, these being placed near the outlets of the main wide draining canals, into which open all the navigation trenches and smaller cross-drains. By the opening and shutting of these sluices and kokers according to the state of the tide, the excess water is drained off and the salt sea-water prevented from entering.
>
> "So with the adjoining villages—their smaller drains all eventually lead into the big draining trenches.
>
> "But with regard to smaller or larger collections of water, the land being perfectly flat, great difficulty is encountered in dealing with any such."

[Dr. OZZARD in differing from Dr. Malcolm WATSON offers no statistics, and deals with generalities leaving the problem open. Dr. Malcolm WATSON's statement is also a generalization, and he doubtless would be the first to admit that exceptional conditions in an area may be expected to bring about exceptional results. But Dr. OZZARD gives such good reasons for the breeding of Anophelines in the neighbourhood of dwellings that it might well have been offered as a solution of the problem of localized malaria, without minimizing Malcolm WATSON's dictum. Evidently, drainage of land sufficing for sound agricultural results would, as to malaria amongst inhabitants, have but little influence in epidemiology in the presence of pools in the immediate neighbourhood of dwellings, as thus described by him:—"Although there are highly cultivated areas of land amongst which the labourers and estate staff live, yet the immediate surroundings of the dwellings of all such may be eminently suitable for the breeding of malaria carrying mosquitoes."

When land in the neighbourhood of villages can be efficiently drained for successful agriculture, it can but be the result of a *laissez faire* policy by owners or public authorities that efficient drainage is not applied to immediate surroundings of dwellings, in the interest of anti-malaria measures. The condition is analogous to a community possessing a public sewerage system and neglecting to effect its junction with dwellings.

The circumstances described by Dr. OZZARD point to a fact greatly neglected by those who have opposed drainage as an anti-malarial measure, on the ground that the drainage of huge areas would involve enormous expense for the safety of a few thousands of the many million inhabitants of a country possibly possessed of scanty funds: namely that, whilst some form of drain conveying the collected water to a distant discharge point may be requisite, the actual area drained in detail need not exceed a zone round villages, whose radius is greater than the normal flight distance of the Anophelines of the neighbourhood.

The contrast made by Dr. OZZARD between the malarious condition of estates along the coast land and those which border the banks of big rivers (those in the latter area being the greater sufferers) is the real problem suggested by his paper. This must be solved by local expert knowledge; but, in the meantime, the writer suggests that it is significant of the advantage of agriculture and drainage as anti-malaria measures that, according to Dr. OZZARD, "sugar cane cannot thrive unless the land in which it is grown is exceedingly well drained," and that a preference for the opening of the estates near the coast line is evident. Within this selected area, there may exist, in the tidal control arrangements of drainage described by Dr. OZZARD, a system by which aeration of the soil—of advantage to agriculture—is facilitated by the check and flow influence upon the subsoil water securing a respiratory movement of air, whilst the removal of surface and subsoil water, in the aggregate, may be more complete, although intermittent, with resulting proportionately greater benefit against malaria. In any case, British Guiana accomplishes its drainage, in spite of difficult topography, by the open method which when carefully supervised is of advantage, but does not afford the ideal offered by subsoil drainage; whilst to secure the value of tidal influence the distal ramifications of drains, such as are likely to be found in the neighbourhood of dwellings, would require special attention.]

The Control of Irrigation.

In India the work of A. H. HOWARD, C.I.E., at the Pusa Institute, and of W. H. HARRISON, B.Sc., in Madras, has shown that for sound agriculture aeration of the soil is essential and, therefore, water-logging and water waste are inimical. The engineers in charge of the Irrigation Branch of the Indian Government Department of Public Works, since the days of Baird SMITH, have not failed to show that a canal whose efficiency is reckoned in cusecs at the head works may well belie a financial estimate based thereon or its possibilities, owing (irrespective of evaporation) to seepage from the canal bed to the adjacent soil. DEMPSTER, of spleen index fame, and Baird SMITH recognized that irrigation canals which by seepage, wasteful water measurement and distribution, or bad alignment, brought about water-logging, were factors of vast importance in malaria propagation, and consequent sickness and mortality of the populations which irrigation canals were intended to benefit. Ross has, in the meantime, shown the reason why.

Thus it is seen that to-day agriculture, engineering and sanitation agree that, *for reasons held by the respective sciences to be of vital importance, not a drop more water than can usefully be employed for plant growth should pass from canals to soils served by them.* If to this consensus of opinions it were possible to urge that, putting aside the difference in value of healthy and unhealthy populations, it would be, financially, a sound undertaking to sink capital in preventing waste and seepage, for which a handsome financial return might be expected, it might well be hoped that irrigation in tropical countries will prove a blessing devoid of the alloy which has hitherto been so apparent.

The *Indian and Eastern Engineer* (Calcutta), in its issue for September, 1917, p. 78, takes note of papers read at the Punjab Engineering Congress by Mr. F. W. WOODS, Chief Engineer—"The Absorption Losses of Punjab Irrigation Canals"—and by Mr. T. A. CURRY, Executive Engineer—"Lining Irrigation Channels."

The total wastage in canals was reckoned as follows :—

(*a*) Loss in the Main Canal and Branches..	20	per cent.
(*b*) Loss in Distributaries	5	,, ,,
(*c*) Loss in Watercourses	20	,, ,,
(*d*) Loss arising from Waste on the fields ..	25	,, ,,
	70	per cent.

The papers show that, in the 8 million acres under irrigation in the Punjab, if absorption losses could be eliminated, 1⅔ million additional acres could be served. This addition would yield on "the present average net revenue of Rs 3 per acre, an annual net return of Rs.5,000,000, while the value of the crops irrigated would be increased by nearly six crores of rupees per annum." This, it is held, implies that whilst about 8,000 cusecs are lost by absorption "a capital outlay of Rs.12,500 would be well spent for each extra cusec" delivered for irrigation: so that "on the average for the whole of the Major Canals of the Punjab an expenditure of Rs.10 to Rs.12/8 per hundred square feet of wetted area would be profitably spent on the elimination of percolation losses" [see also this *Bulletin* (Sanitation Number), Vol. 7, No. 7, June 30, 1916, p. 440].

Reclamation of Water-Logged Tracts.

Indian Engineering (Calcutta) of September 15, 1917, p. 150, places on record evidence of the tendency in India to realize that water-logged soil is both in regard to the health and wealth of communities a bad asset, and that of the various methods of remedy at disposal drainage, in its various forms, has merit that has required no experimental test for many generations. It reports that under the Lower Chenab Canal (which is not water-proofed) an area became so water-logged as to give the cultivators reasons for petitioning tor compensation—even rice cultivation affording no satisfaction. As a result, in 1905–06, a drain 31 miles in length was arranged to connect with an existing escape channel, which led to the river. This scheme seems to have taken little or no cognizance of the circumstances under which water-logging was present; "the bed of the drain on an average was only 1 ft. below the natural surface." Success did not follow this work. In 1914, however, "the reclamation of the swamped area was again mooted, and this time a proposal to dig a drain of 7 ft. wide and an average depth of 5 ft. below natural surface was carried out." Evidently at this depth and breadth relief of the overtaxed soil was feasible. As a result, "7,000 acres of land previously a swamp have been made available for cultivation." Seven tributary drains have been added, and "*aeration and natural fertilization of the soil seem to* *be better in the immediate neighbourhood of the drains* [italics not in original] when luxuriant rain grown crops were visible during the *rabi* of 1916–17."

" *Lives and Dollars Saved.*"*

America is not letting it be imagined that, having conquered malaria in Panama in the interests of international commerce, the experience gained in the fight would not be used for the defeat of this enemy of labour in her more immediate midst. Edwin GOULD (Chairman of St. Louis South Western Ry. Co., U.S.A.) as a result of "recent study of health conditions on the railroad, and the large employees' hospital," formed the opinion that loss of health and of labour value under the influence of malaria was of vast importance. This impelled him, from his private funds, to form "a trust fund amounting to many thousand dollars" for anti-malaria measures. Charles SAVILLE, Director of Sanitation, City of Dallas, and H. W. VAN HOVENBERY, Sanitary Engineer, St. Louis, South-Western Ry., have written an interesting account of the result so far secured, in the *Engineering News Record* (New York) of January 24th, 1918. In this, after recounting the origin of the campaign, they point to the public importance of anti-malaria efforts now being made by the U.S.A. Army authorities in connection with the encampments for the vast bodies of men assembled for military training in the United States. The practical demonstrations of benefit in the encampments by the Army authorities have afforded object lessons to "communities adjoining encampment sites which they are utilizing in getting rid of malaria." [A good illustration of the fact well known to all practical sanitarians that, whilst education of peoples is an aid to "peaceful penetration" of sanitation, it is by *practical demonstration of its benefits* that sure and quick progress can be secured—"cleanliness begets cleanliness, dirt begets dirt."]

The city of Dallas, which was the object of anti-malaria efforts, contains 140,000 inhabitants. In the Mexican quarter of the city, 30 per cent. of the inhabitants were found on microscopical examination of blood to harbour tertian parasites.

"In an area of 17 square miles, there were some 40 miles of water courses favourable to the development of mosquitoes." For the draining of these, the topography of the area was favourable. It was determined to give first attention to parts of creeks and streams recognizable as active anopheles breeding places, and then proceed to deal with the less important places elsewhere.

"The work consisted in both places in :—

"(a) Clearing of banks of grass, weeds and débris, to destroy shelters and facilitate ditching and oiling.

"(b) Ditching of streams to get channels of minimum cross-section, with sufficient flow to keep the channel scoured.

"(c) Filling large holes situated under bridges and at ends of culverts, pot-holes in creeks, overflow pools, etc.

"This work was followed by oiling water surfaces at regular intervals or, where feasible, by stocking with, or cultivating the growth of, top feeding minnows in streams and ponds.

"The field work embraced six main streams having a total length of 30 miles and an average high water channel width, before the work started, of approximately 30 ft. Extensive marshy areas were also drained by ditches, several thousand feet in length, *reclaiming many acres of valuable land for agricultural and business purposes.* [Italics not in original.] The field force comprised five to ten men during the summer months. They were paid 25 c. an hour in 1916, and 30 c. in 1917. . . . The field equipment included short and long handled shovels, hoes, trench spades, picks, rakes, grass-cutting tools, axes, storage of oil barrels, 5-gal. oil cans, two Meyers Bros. No. 330 G.I. knapsack sprayers, and a Ford runabout equipped with a delivery wagon body.

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* This "to the point" phrase is used as a sub-head by the authors of the article under reference.

"Algae growth and moss were removed from the creeks by sweeping with a stable broom. Attractive sign posts giving police warning were erected to discourage throwing of trash in streams and to prevent mischievous boys from building dams. A municipal ordinance was adopted to compel the removal of mosquito-breeding areas on private property. Along with actual field work, an educational campaign was carried on through public lectures, health department publications and exhibits. . . .

"About 300 gal. of a compounded oil were used monthly. The oilers waded down the creeks with knapsack sprayers on their backs, replenishing their supply of oil at regular filling stations. The cost of field work on the six principal streams, including all supplies, wages, automobile expenses, and supervision, during the active mosquito season, averaged about $16 per month per mile. . . .

"An indication of the reduced prevalence of malaria in Dallas is shown by the records of the City Charity Hospital. Only four patients were treated for this disease in July and August, 1917, as compared with 85 such patients in the same months in 1916. . . .

"The records of the Dallas city registrar show that there were 27 deaths in Dallas during the year ending Aug. 1, 1916, which was before anti-malaria work was well started. During the following 12 months there were only nine deaths from malaria, a reduction in mortality of 66⅔%, despite a material increase in population. Assuming the value of a life to be $3,000 and the cost of an average case of malaria, for medicine, attendants, and wages lost, to be $25, and using the ratio of one death to every 400 cases, we find a probable economic saving to Dallas inhabitants through reduction in the disease to have been nearly $200,000, or about $1·25 per capita. Compare this saving with the 3c. found to be the actual cost per inhabitant of effectively controlling malaria. What other investment yields so great a return ?"

South Africa.

Dr. W. R. Greening, in the *South African Medical Record*, April 14, 1917, gives an account of a successfully conducted campaign against malaria which is remarkable for the numerous factors involved, and the rapidity and thoroughness with which these were got rid of. The environment concerned was that of a permanent camp containing 500 whites and 2,500 natives. In this camp "every year saw an outbreak of more or less severity, according to the rainfall, culminating in the season 1914 and 1915 when malaria was very rife, in some cases whole families being down at one time and a large percentage of the Mine staff constantly sick." The following were some of the more obvious conditions that demanded attention in undertaking anti-malarial measures :—

Mosquito breeding facilities.—The camp is surrounded by thick bush, interspersed with baobab trees, and bounded on the east by a range of huge kopjes, from the direction of which comes the prevailing wind ; these kopjes consist of huge masses of rock in which are large numbers of hollows, which hold water after rain : one and a half miles to the south is a series of shallow water holes forming a large breeding area of mosquitoes on the path of the prevailing wind, and abutting on the township a rocky flat holding pools during the rainy season : waste water from baths received directly on ground and garden irrigated: uncovered tanks, cisterns, etc. Certain trees were a special "source of danger in that they harbour water for long periods after rain." For example, the Maroola tree, which has "an innocent looking little hole at about four or six feet from the ground of one to two inches in diameter . . . this hole leads to a cavity in the trunk capable of holding anything up to five or six gallons of water, according to the age and size of the tree. This water remains sufficiently long "for several successive lots of larvae to hatch out." Paw-paw trees were also found to afford water-holding hollows.

Mosquito carriers.—Cattle, especially those with dark hair, and police in dark uniform were found to be involuntary bearers of Anopheles. In reference to the cattle as carriers, the distant water-holes used by them were brought under control.

Malaria bearers.—Squatters resided in the neighbourhood of the camp as well as uncontrolled natives.

The chief anti-malaria measures pursued were: "all houses were screened," the squatters were brought into camp, a native location was formed. All drains and hollows were filled "regardless of expense"; hollows of trees were stuffed with clay or the trees were cut down; hollows in rocks were filled with concrete, but where "at a great height and the most inaccessible places imaginable" they were kept under control by the use of paraffin.

Results.—The campaign was started in 1915. Writing in April 1917 Dr. GREENING states that "the campaign has been completely successful in its object, and during the last season and the one now almost concluded, there has not been a single case of fever incurred locally."

[This campaign affords a good instance of the successful employment of what are classed as "minor anti-malaria measures" uncomplicated—so far as stated in Dr. GREENING's paper—by quinine prophylaxis.]

Anti-Malarial Measures in Madras.

It required popular pressure, following a considerable exacerbation of malarial fevers amongst the population of the City of Madras in 1913, to induce the Municipal Corporation to regard anti-malaria measures "seriously." After the decision to adopt an anti-malaria policy, action however has been continuous and persistent. The population is already reaping the benefit of these efforts; in 1916, malaria caused 4·3 per cent. of the total mortality, against 9 per cent. in 1913, and 11 per cent. in 1914.

The practical experience acquired in Madras City in the use of various anti-malaria measures has therefore a distinct value. An interesting record by Dr. K. RAGHAVENDRA RAO is found in the Annual Report for 1916 of the "Health Department and Special Malaria Department of the City of Madras."* Instead of adopting the views of the enthusiast for this or that special anti-malaria measure, he espouses the common-sense opinion that each recognized method has its sphere of utility. He classes reclamation and drainage as ***radical measures of permanent utility***, and cleansing of ponds, petrolising, clearing and quininisation as palliative measures of temporary utility requiring intermittent and insistent care, but necessary of adoption until radical measures have secured their influence. In illustration, he states that large marshy areas have been drained; "the drainage work has been supplemented by reclamation, and it may be fairly claimed that in these directions tangible and striking success has been achieved."

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* Printed by Thompson & Co., 33, Popham's Broadway, Madras.

In connection with the maintenance of "tanks"* in conditions inimical to mosquito breeding, Dr. RAGHAVENDRA RAO invites attention to a legal ruling suggested by his predecessor (as special anti-malaria Officer), Capt. HODGSON, I.M.S. This suggested ruling it seems to the writer is equitable, and is likely to commend itself to those concerned with anti-malaria measures generally. Capt. HODGSON'S recommendation is as follows† :—

"It will be necessary that some permanent fund be put aside yearly to keep these tanks clean. And I propose suggesting that it should be necessary for the owner of a tank to have a license to keep the tank, otherwise he must be compelled to fill it up, and the fee for this license should be sufficient to pay for the cleaning of the tank periodically at the expense of the Corporation. It is perfectly impossible to expect private owners to keep their tanks clean. They have neither implements nor the trained staff to keep them clean even if they were cleaned in the first instance by the Corporation. Also it will be far more expensive for the private owners to keep a gang to clean them than that the Corporation should undertake the work for them. If it is insisted that private owners are to keep their tanks clean, it will mean a large staff for inspecting these tanks and a very large number of cases in court every year. That is to say the maximum amount of discomfort and the minimum amount of efficiency."

On the subject of employment of fish as larvicidal agents, Dr. RAGHAVENDRA RAO gives the following as the result of extensive experiments, and observation of results in practice‡ :—

"After further experience with these fish I doubt whether they are as useful under natural environments as under somewhat artificial conditions. Fish are not of much use as enemies of mosquito life if the water surface is covered with plenty of weeds, leaves and twigs; for then, they cannot get access to the little mosquito larvae which find a safe shelter underneath the floating material of this description. . . . It therefore comes to this, that, fish or no fish, mosquito larvae thrive in a tank or pond which is not kept cleaned and recleaned; and if it is kept so cleaned and recleaned, mosquito larvae do not thrive, fish or no fish. This does not mean that fish do not, to some extent at least, act as larvicidal agents in the intervals between the cleanings."

Quinine Prophylaxis.

The Sanitary Commissioner for the Government of Bombay, in his Annual Report for 1916 [p. 14], states, "Three thousand six hundred and sixteen pounds of quinine were sold or distributed free in the Presidency and Sind by district local boards, municipalities, and post offices." He holds that "malaria is practically present throughout

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* The word "tank" as used in India refers to collections of water used for domestic purposes or for cattle and clothes washing; at times, unfortunately, for all three purposes combined! Their area is frequently considerable. Thus, the Report under notice mentions tanks of 600′ × 54′, 120′ × 660′, 200′ × 100′ and so forth.

† Corporation of Madras. Annual Report of the I. Health Department and II. Special Malaria Department of the City of Madras for the Year 1916. 1917. Madras: Thompson & Co. pp. 122–123.

‡ *Loc. cit.* p. 123.

Sind"; in that area, 685 lb. or the equivalent to 1·5 gr. per head of population was distributed, but to use quinine reasonably as a prophylactic "50 to 100-fold the weight" is really necessary. He, therefore, advises that as provision of quinine to this extent would obviously be impossible, the prophylactic use of quinine should be confined as far as possible to school children, "with a view to getting the maximum benefit from the limited available supply."

The juvenile Department of the Bengal Jails does "its bit" in the prevention of malaria, by manufacturing tablets of the quinine received from the Government Cinchona Plantation in the Darjeeling Hills. The outturn of these tablets in 1916 amounted to more than the yield of the plantations, namely, 64,314 lb., against a normal average produce of 50,000 lb. Supplies were made to the Medical Stores Depôt of Madras and Bombay.

YELLOW FEVER.

? In Maracaibo.

As a result of Dr. SCOTT's work in Jamaica "vomiting sickness" will no longer be regarded as a mild form of yellow fever. Maracaibo, in Venezuela, is another locality where a fever locally known as yellow fever awaits a determination of its character by expert investigation. According to the Annual Report of the Surgeon General of the Public Health Service of the United States for 1917, p. 126, the "general trend of medical opinion, both of physicians there and leading men in Caracas, both medical and others, seems to be that occasional cases of yellow fever occur there and in that vicinity." On the other hand, "the Yellow Fever Commission of the Rockefeller Institute is inclined not to believe in the endemicity of yellow fever in Maracaibo." Nevertheless, as deaths were hardly ever reported from this disease, German firms before the war "made it a practice to send young employees just out from Germany first to Maracaibo, in order to contract the mild form for which the place was noted. Sometimes one died, but it was exceptional."

Breeding Places for Mosquitoes.

Dr. ALLAN, Medical Officer of Health, Freetown, in his Notes embodied in the Annual Medical Report, Sierra Leone, for 1916, states [p. 65] that he found 13 8 per cent. of 67 wells examined contained mosquito larvae. The larvae, as diagnosed by the Imperial Bureau of Entomology, were:—"*Culex decens* in 54 wells; *Stegomyia fasciata* in 8 wells; *Culex insignis* in 2 wells; Anopheles in 1 well; *Culiciomyia nebulosa* in 1 well; *Culex tigripes* in 1 well."

In 506 instances, mosquito larvae were found in cavities of trees, most commonly *Stegomyia fasciata* and *S. simpsoni.* Out of twenty specimens of larvae from cavities, fifteen "bred out" were of the former variety. During the year, 609 cavities were treated with cement.

DYSENTERY.

Poona.—According to the Sanitary Commissioner for the Government of Bombay 1916 (Lt.-Col. HUTCHINSON, I.M.S.) the mean death rate from diarrhoea and dysentery for the quinquennium, in Poona, amounted to 8·97, and for 1916, 4·85.

This mortality has been assigned on the one hand in the main to the agency of flies and, on the other, to contaminated water-supply. At one period, chlorination of the public supply seemed to have settled the matter; but inefficient carrying out of this method is now held to have vitiated the possibility of arriving at a definite conclusion [see this *Bulletin* (Sanitation Number), Vol. 10, No. 1, July 15, 1917, p. 21]. In the meantime, it is evident that in the Bombay Presidency there are other nurseries of diarrhoea and dysentery which may reward sanitary effort, the mean quinquennium death rate from these diseases in Sholapur being 12·27 and 9·22, respectively. In regard to Poona, the Sanitary Commissioner states*:—

"The slightly enhanced mortality from these diseases [dysentery and diarrhoea] during the year was associated with the increased incidence of cholera. The invariable prevalence of these diseases in the monsoon months is connected with the washing into water supplies of surface impurities. The partial sterilization of the Poona city water-supply was carried out throughout the year. The death-rate was below that for 1915 and very nearly half the quinquennial mean. The system of distribution is very faulty and to some extent vitiates the result of the initial partial sterilization. If a good system of distribution and more perfect sterilization were possible the death-rate in Poona city from these diseases would decline still further. The experience of 1915 held out the hope that the monsoon epidemic in Poona cantonment would not recur. Unfortunately this was not realized, and the opinion was freely expressed that water could have no causal connection with the disease. It must be remembered that the sterilization of the water was very imperfectly done, owing to the dose of the re-agent not being calculated. It was also found that the water issuing from taps differed bacteriologically very considerably from that in the pure water reservoir. The possibility of insuction of an impure subsoil water is being investigated."

Sierra Leone.—The Sierra Leone Annual Medical Report for 1916 contains much evidence of increasing attention to dysentery. The prevalence of this disease in the Freetown Prison is reported by Dr. D. BURROWS (Acting Principal Medical Officer) to have led to the introduction in that institution of "apparatus for cooking and sterilizing all food and feeding appliances." In regard to water, the precaution taken is "the boiling all water and the provision of shower baths."† He holds that, under these conditions, the "majority of cases are introduced from without." These methods are strengthened by a "thorough examination of new-comers" by Dr. YOUNG, resulting in cases of acute dysentery being detected "as well as their equally dangerous companions—the cyst carriers." These cases are promptly isolated, "until it is reasonably supposed they are free from infection."

The Report of the Medical Officer (Dr. W. A. YOUNG) in charge of the Prison shows that 161 cases of dysentery were treated during the year.

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* Fifty-Third Annual Report of the Sanitary Commissioner for the Government of Bombay, 1916. 1917. Bombay: Printed at the Government Central Press. p. 13.

† Open troughs surrounded by drained platforms, from which prisoners paraded for bathing removed water *by dipping* were, some years back, common in Indian Jails, although at the present time largely superseded by shower bath systems. In two instances of cholera epidemics investigated by the writer, contamination by choleraic matter of such troughs was proved. Equally in the presence of all water-borne diseases, open troughs must be dangerous. In spite of stringent discipline and provision of safe sources of drinking water, there is risk of these being used for the latter purpose.

In describing means for protecting food and water from contamination, he states that "all cooking baskets, receptacles, boards, etc., can be and are sterilized each day." The cooks also are not excluded from prophylactic efforts, as they are given "injections of emetine at intervals as an additional precaution." Doubtless, in the midst of measures thus carefully instituted, all possible care as to night soil conservancy and laundry arrangements for prisoners is also observed, but unfortunately the Report furnishes no details on these points.

Naturally, in view of his opinion that the prison suffers by reason of importation of the disease, Dr. YOUNG draws attention to the prevalence of dysentery in the free population of Sierra Leone. He holds that the "conditions are such that amoebic carriers are plentiful in Freetown and the habits of the people tend most effectively to spread of the disease." To the employment of the Freetown inhabitants in the campaign in the Cameroons, he ascribes the spread of dysentery in the force employed there. Dr. YOUNG concludes his Note on the subject as follows [pp. 30–31]:—

> "Although amoebic dysentery may and can be spread by water contamination, the water supply of Freetown, as it arrives at the stand-pipes and taps, at the present moment, does not contain *Entamoeba histolytica* or its cysts. Since so far no case has been shown by bacteriological methods to be due to Shiga and Flexner's Bacilli, it may safely be assumed that the dysentery here is spread more or less directly from person to person."

But Dr. YOUNG adds a saving clause of no small import:—"Water supply does not include the Freetown wells."

When the Report of the Medical Officer of Health of Freetown (Dr. W. ALLAN) is consulted on the question of the nature of "the wells" of Freetown, it is found that cesspits or cesspools (of which there are 3,000) are in close proximity to them. Dr. ALLAN thus sums up the position:—

> "So long as cesspools are allowed to exist, it is out of the question to expect any marked reduction in the amount of intestinal disease, which is becoming one of the most acute problems the Sanitary Branch has to deal with. The elimination of all well water as a domestic supply might improve matters, but the cesspits would still continue to contaminate the soil, to breed flies and so spread infection.
>
> "The solution lies in the closing of all cesspits, and all wells, and the general adoption throughout the city of the dry earth pan closet or the introduction of a water-carriage system" [p. 76].

Dr. ALLAN is hopeful of at least an improved water supply being at disposal by completion of the Freetown water-works, which will include increase in the size of the Tower Hill reservoir "so as to bring the total service capacity up to one million gallons." He adds that "well water is still drunk by the inhabitants."

[The facts referred to by the Medical Officers concerned show that the extensive precautions rightly adopted in Freetown Prison can only be regarded as defensive, and that constant importation of the disease must be expected. Not only must Freetown therefore be regarded as still the subject of incomplete sanitary measures against malaria and a possible nidus of yellow fever, but as a centre whence areas in communication with it incur danger of spread of intestinal infection.

The soundness of Dr. ALLAN's advice as to closure of all wells, even in the presence of a complete public water-supply, is obvious. The average Oriental is not alone in forgetting that the nearest source of water-supply is not necessarily the purest. Radical improvements will presumably be regarded as a necessity "after the war."]

Jamaica.—In his Report, as Government Pathologist, embodied in that of the Superintending Medical Officer, Jamaica, for 1916-17, Dr. H. H. SCOTT recalls the fact that, a short time back, it was held that amoebic dysentery [p. 43] did not exist in Jamaica. On examining 191 specimens for this form of the disease, he however found that 89 conformed to the type. These results he urges "must be earnestly regarded as a note of warning." They show that the disease "is a menace now and likely to become much more serious when the troops return from the front, for a large number of the dysentery cases from the Eastern theatre of the War at least are amoebic."

Helminthic Influence and Dysentery.

Dr. YOUNG, in the Annual Medical Report for Sierra Leone, 1916 [p. 31], finds a relation between infestation by worms of the intestines and dysentery, as follows:—

"The presence of the ova of various intestinal worms is almost an invariable quantity in the examination of faeces otherwise regarded as normal. Now, during the stage of acute or sub-acute dysentery these ova were rarely noted, but as soon as a convalescent patient's faeces reached the stage of containing 'a few pus cells and a little mucus and no erythrocytes and amoebae' the ova began to re-appear, the presumption being that the morbid condition of the intestinal tract was inimical to the egg-laying function of the parasite."

[According to MAUTÉ (Military Medical Manuals—edited by Col. A. BALFOUR, A.M.S., and Capt. George C. Low, I.M.S.) "Dysentery, Asiatic Cholera, etc." [p. 41], great practical importance should be attached "to the investigation of associated parasites, the superaddition of these seeming to maintain and augment the resistance of the amoebae."]

YAWS.

Of thirty-three districts and localities reporting on the subject of yaws, according to the Annual (1916–17) Report of the Superintending Medical Officer, Jamaica, only three state that this disease is not prevalent. Such terms as, "exists in overwhelming numbers," "exists in every part of the district," "very prevalent," etc., used by the Medical Officers concerned, show that the suppression of this disease is a matter of importance to the Jamaica population.

Considerable effort is being made by the Medical Officers to induce affected persons to submit to treatment. At p. 7 of the Report, a list is given showing the drugs employed in 2,557 cases, and the average time for cure of symptoms. These were kharsivan, salvarsan, arsenobenzol Billon, and galyl. Unfortunately, the groups of cases are not always differentiated in respect to the actual drugs used (certain of which are presumably chemically the same, although supplied with different names), but as, in several instances, only one of these drugs was employed, some idea of efficiency can be formed. At p. 26 of the Report, however, remarks as to the comparative efficacy of four preparations employed in treatment of 424 cases is afforded by Dr. C. A. MOSELEY, District Medical Officer, Port Antonio, as follows:—

"As regards the relative merits of the different preparations, I found that Diarsenol gave excellent results. It is more soluble than any of the others named above, and pain and swelling at the seat of injection very rapidly disappeared. The cases treated with it were all very severe cases of general yaws; in children it was marvellous the rapidity with which the symptoms disappeared.

"Galyl was sent to me in only emulsion for intramuscular injections and was used almost exclusively in the treatment of children, the results obtained were good.

"Kharsivan I thought more toxic than the others, several cases of jaundice developed and several of the persons treated had gastric intestinal symptoms.

"Arsenobenzol was used more extensively than any of the others, not because it was thought to be a better preparation but because it was the one supplied most frequently. The results were uniformly good and no toxic symptoms occurred, in any of the persons treated."

[Having regard to the apparently inoculable nature of this disease (by transfer by flies or other mode of contact of discharges with abraded surfaces) there would seem room for inauguration of systems of house and personal hygiene in prophylaxis—including occlusion of abraded surfaces—as an adjunct to the present adoption of curative measures.]

SMALLPOX.

Protection by Vaccination.

Dr. K. RAGHAVENDRA RAO, Health Officer of the City of Madras, in his Annual Report for 1916, furnishes the following table and appended remarks. In interpreting the results generally and especially the percentage of infants under one year attacked, it must be held in mind that vaccination is not compulsory in the City area under six months of age* :—

"The following remarks are based on 673 cases of smallpox, in which the vaccinal conditions of every case were accurately reported after a careful and personal observation. Of the 673 cases the reports of 485 cases were received from the two Corporation Infectious Diseases Hospitals recording the vaccinal conditions of cases of small-pox admitted in them :—

	VACCINATED.		UNVACCINATED.	
	Attacks.	Deaths.	Attacks.	Deaths.
Under one year	12	5	63	39
Above one and under five years ..	32	9	69	34
Five and under ten years ..	53	2	17	5
Ten and under fifteen years ..	45	2	8	2
Fifteen and under twenty years ..	76	4	11	1
Twenty and under twenty-five years	71	3	8	1
Twenty-five years and above ..	181	15	27	13
Total ..	470	40	203	95

"Of the 75 cases amongst infants under one year of age whose vaccinal conditions were verified it is found only 16 per cent. of the attacks with a case mortality of 41·7 per cent. were amongst the vaccinated, against 84 per cent and 62 per cent. respectively in the unvaccinated. The same relative advantage to the vaccinated as against the unvaccinated is again illustrated in the next age group 1 and 5 in which the ratios work out as follows :—

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*Corporation of Madras. Annual Report of the I. Health Department and II. Special Malaria Department of the City of Madras for the Year 1916. 1917. Madras: Thompson & Co. p. 28.

	Per cent. of attacks.		Case mortality.
Vaccinated	31·68	..	26
Unvaccinated	68·32	..	50 "

The Health Officer points to the importance of re-vaccination, and whilst recognizing the difficulty of securing the sanctioning of this ruling urges that " at least it may be made compulsory for contacts to get themselves vaccinated." Under his encouragement and the incitement of epidemic smallpox, this prophylactic measure is receiving increased attention; there being recorded 46,120 re-vaccinations in 1916 against 4,622 in 1914.

In his Annual Report for 1916, the Sanitary Commissioner (Lt.-Col. F. H. G. HUTCHINSON, I.M.S.) for the Government of Bombay gives the following results of a similar investigation* :—

> " One thousand four hundred and eighty-two attacks of smallpox were investigated during the year by officers of the Sanitary Department. Of these, 954 were among the vaccinated, and 528 among the unvaccinated. Of the former, 40 died, giving a case mortality of 4·2 per cent. Of the latter, 123 died, causing a case mortality of 23·3 per cent., over 5 times as great as among the vaccinated.
>
> " The average age of vaccinated persons attacked by smallpox was 18 against 8 for unvaccinated persons. The average age of the vaccinated persons fatally attacked was 22 against 4 for unvaccinated persons. These are very important figures and indicate the protection against smallpox afforded in early life by vaccination.
>
> " Among the vaccinated less than 1 per cent. of the fatal cases were in infants under one year, while among the unvaccinated the percentage was over 10. It is necessary to explain the fatal incidence of the disease among vaccinated infants. An enquiry proved that the smallpox eruption broke out on the 4th or 5th day after vaccination. The immunity afforded by vaccination may take 14 to 21 days to develop, so these infants were unfortunately not vaccinated in time."

ROCKY MOUNTAIN SPOTTED FEVER.

In dealing with " Rocky Mountain spotted fever " the U.S.A. Public Health Service has encouraged the employment of sheep grazing, because " sheep in small bands naturally graze in a manner adapted to tick [*Dermacentor occidentalis*] eradication." For this purpose, during 1917, 45,000 sheep were introduced into the Bitter Root Valley after the following experiment had been made† :—

> " The introduction of these sheep was a result of several seasons' effort, and if sheep grazing upon this scale can be placed on a business basis in the valley, so that the movement will be continued from year to year, it is expected that it will go far toward clearing up the spotted-fever situation.
>
> " A band of 500 sheep was secured for experimental use and grazed first in a near-by tick-free irrigated pasture, then for 10 days over adjacent tick-infested territory, and finally back to the pasture for observation. The purpose of this experiment was to show that by watching the tick

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* Fifty-Third Annual Report of the Sanitary Commissioner for the Government of Bombay, 1916. 1917. Bombay: Government Central Press. p. 20.

† Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1917. 1917. Washington: Govt. Printing Office. pp. 225–226.

infestation closely on a small band, the sheep might be grazed over territory showing a high degree of infestation, provided they are shifted as often as every 10 days to nearly tick-free pasture. . . .

"The entire spotted fever situation, so far as the Bitter Root Valley is concerned, appears to be much more satisfactory than ever before. The adoption of proper grazing methods, the realization of the inadequacy of dipping domestic animals, the continuation of small animal destruction, and the contemplated enactment of suitable legislation, have all served to place the work of tick eradication and the elimination of spotted fever on a more scientific basis. There is reason to believe that if these procedures can be continued as outlined the ultimate control of spotted fever infection in this district will be effected."

BERIBERI.

Notwithstanding the overwhelming evidence of the position of beriberi as a vitamine deficiency disease, it remains to be proved that under this term, in the tropics, one or more diseases, of which the symptomatology is similar, do not owe their origin to other causes. There are therefore still advocates of an insect-borne beriberi. Dr. Arthur STANLEY, Health Officer, Shanghai, in his Annual Report for 1916 [p. 26] makes the following observations on the subject:—

"Four new cases of Beri-beri occurred. Since 1899 the number of cases of Beri-beri among prisoners in the Gaol in sequence of years was 27, 34, 134, 0, 0, 2, 2, 2, 1, 5, 78, 16, 7, 0, 2, 13, 0 and 6 during the year under review. From 1899 to 1901 the ordinary sanitary measures of isolation and disinfection were carefully carried out without success, no special measures against infestation with body vermin being taken. The new Gaol, presumably vermin free, was then occupied and at first no cases of Beri-beri occurred, in marked contrast to the severe infection in the old Gaol. From 1904 till 1909 the cases of Beri-beri gradually increased, reaching a maximum in 1909 when the Gaol was found infested throughout with bugs. During the last four years measures were taken to exterminate bugs which are held responsible for the reduction in the number of cases of Beri-beri. The diet during the whole of this period was substantially the same."

The Acting Health Officer, Rangoon (Dr. J. HORMASJI), in his Annual Report for 1916 [p. 6] states that 122 deaths from beriberi were registered during the year; of these 105 were reported from hospitals and other public institutions. The deaths from this disease for the different races were proportionately as follows:—

Race.	*No. of deaths.*	*Rate.*
Hindus	71	·65
Mahomedans and Malays	19	·35
Burmese	17	·20
Chinese and Panthays	3	
Others	12	·52

Having regard to peculiarities of diet of these races living in the same locality, such statistics if maintained from year to year should be of value.

ANKYLOSTOMIASIS.

India.

Attention was directed to the presence of ankylostomiasis in the Madras Presidency by Asst. Surgeon HADDON, I.S.M.D., in 1886, by Surgeon Captain WILLIAMS, I.M.S., in 1895 (*Indian Medical Gazette*, May, 1895, p. 195) and Captain FEARNSIDE, I.M.S., in 1896. Their observations however resulted chiefly in increased care being given to the influence of infestation upon prisoners. A Reprint of a paper which appeared in the *Indian Journal of Medical Research* (Vol. 4, No. 4, April, 1917) on the subject of the conditions as found in the Madras general population has been largely officially circulated in India. This contains the record of an investigation by Dr. K. S. MHASKAR, with a covering note forwarding it to the Advisory Board of the Indian Research Association.

Dr. MHASKAR selected, as an appropriate centre of observation, the Recruiting Depôt at Negapatam, whence coolies are drafted to the Straits Settlements. As there is no restriction as to area of recruiting, the coolies assembled there are fairly representative of the labouring population of the various districts of the whole Presidency. As a corrective to deductions drawn solely from the labouring class, haphazard examination of citizens of all classes of the town of Negapatam was also undertaken.

Samples of stools for examination, Dr. MHASKAR found, were best collected "in drachm vials containing 1 or 2 per cent. lysol." This he prefers to the use of 70 per cent. alcohol, as "it not only sterilizes all material but acts as a deodorant and shows up the ova quite as well as alcohol." He found that ankylostomiasis infection occurs "in all classes of people irrespective of locality, caste, sex, age or occupation." The total found infected amounted to 98 per cent. in 10,000 examinations. With one exception, the genus Necator was universally recognized.

In Major Norman WHITE's Note [p. 14] the following occurs :—

> "From reports already received we were aware that the percentage of the coolies infected was extraordinarily high. By personal examination of all specimens that are returned as 'negative' by his staff, Dr. Mhaskar now finds that the percentage infected is even higher than his early figures indicated. The percentage now approximates 99, in fact it is a permissible generalization *to assert that all the coolies passing through the depôt are* infested with hookworms in varying degrees. The extreme importance and significance of this observation will be discussed later."

Of other intestinal parasites, the following were the percentages observed in 7,577 cases :—

Species of parasite	Total number of cases from.			Percentages in.		
	Depot.	Town.	Villages.	Depot.	Town.	Villages.
1 Ankylostomes . .	5,797	1,326	237	98·5	91·4	98·7
2 Ascaris lumbricoides .	3,483	1,025	114	59·2	70·4	45·8
3 Trichuris trichiura .	2,191	653	89	37·2	44·8	37·0
4 Strong. intestinalis .	439	122	17	7·4	8·3	7·1
5 Oxyuris vermicularis .	89	40	3	1·5	2·7	1·2
6 Taenia solium . .	30	11	—	0·5	0·7	—
7 Taenia saginata . .	24	13	—	0·4	0·2	—
8 No infection. . .	26	29	2	0·4	2·0	0·8
9 Coprophagia. . .	4,789	1,256	182	81·4	86·3	75·8
Total number of cases examined . . .	5,882	1,455	240	=7,577		

In regard to health conditions in sufferers from ankylostomiasis, Dr. MHASKAR states :—

> "The physical condition of coolies, who are more or less selected, in the depot, demonstrates that hookworm infection is not incompatible with apparent good health. On the other hand, the examination of the school children in Negapatam town and two villages indicated that hookworms are responsible for deterioration of physique, anaemia, and much ill health."

[This confirms the accepted opinion that all ankylostome bearers need not necessarily exhibit ill health. The contrast however indicated in regard to children is worth pursuing further, by research as to the influence of the second most common infestation shown in the above table, namely, with *Ascaris lumbricoides.* Whatever may be said in favour of the opinion held by some that in its presence a toxic influence is forthcoming, there can be no doubt of the disturbance of the nervous system and of physiological functions generally caused by it, and in this respect, children would obviously be peculiarly susceptible. Practical experience in curative treatment amongst Indian children shows that this simple fact cannot be safely ignored. Indeed, both in adults and children, in diseases attended with hyperpyrexia, removal of ascarides at a critical moment often proves a life-saving measure.]

In discussing the marked prevalence of ankylostomiasis in the Madras Presidency, Dr. MHASKAR states :—

> "There is the almost universal custom, among the male inhabitants of small towns and villages, of going outside in the morning to any piece of unoccupied land for the purposes of nature. Women and children use back-yards, or a small enclosure especially laid apart, which is open to wind and rain and often accessible to fowls and pigs so that the excreta are scattered broadcast."

Disinfection of Faeces.

The U.S. Public Health Service Report for 1917 affords information as to the present position in respect to treatment of faeces which, where financially feasible, would be of advantage as an aid in an anti-ankylostomiasis campaign* :—

> "From this study it was determined that sodium hydroxide and probably copper sulphate will kill hookworm eggs in feces within reasonable time, at a moderate expense, and with a minimum of labor. It should be observed that *Ascaris* eggs are more resistant than hookworm eggs, and *Endamoeba coli* and *Lamblia* spores less resistant.
>
> "When the disinfected excreta were poured out on the ground, the odor was slight, less than that connected with stable manure. Thus it seems probable that a method may be developed whereby human excreta can be disinfected against the germs of animal parasites as well as against those of typhoid fever and similar diseases, at a low expense, and with little labor, and that the excreta may then be used promiscuously as fertilizer."

VOMITING SICKNESS.

It will be remembered that Dr. H. H. SCOTT, the Government Pathologist, Jamaica, as a result of careful enquiry and experiment has been able to show that the fear, largely entertained, that the "vomiting sickness " of Jamaica was in reality a mild form of yellow fever was baseless. In an investigation into the causation of an epidemic in Duncans District, Trelawny Parish, he was confronted with evidence which, under a less careful method of enquiry, might have led to the belief that " ackee " poisoning had nothing to do with the matter. Cross-examination of the sufferers however elicited full support to Dr. SCOTT's dictum. He ends his Note on the subject by stating, " I am inclined to ascribe the severity of the outbreak to the fact that, owing to the recent hurricane, bananas are very scarce, and the presence of the affection in this district year after year may be due to the scarcity of breadfruit in this locality."*

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* Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1917. 1917 Washington: Government Printing Office. p. 68.

PLAGUE.

Rangoon.

In Rangoon, plague has been present since 1905. The figures furnished in the Report, for 1916, of the Acting Health Officer (Dr. HORMASJI) for that city show that in each year from 1912 to 1916, inclusive, in no month was plague absent. In 1916, the deaths from this disease amounted to 1,810. During the year 385,161 rats were destroyed.

Guayaquil.

The necessity for radical changes in Guayaquil had attracted considerable attention before the outbreak of the war. As a consequence of present conditions the water-supply, which was one of the sanitary works contemplated, has been interrupted in progress. Pending this city being "sanitated," it should form an excellent locality for the ardent student of tropical medical science. If it be desired to study yellow fever (216 cases), plague (577 cases), smallpox, typhoid fever, malaria, intestinal parasites, dysentery (bacillary and amoebic), tuberculosis, chickenpox, and poliomyelitis, according to Passed Asst. Surgeon Herman B. PARKER† all were present during the past year. There is usually no lack of material as to yellow fever Although it certainly would not do, in the absence of special investigation, to quote Guayaquil as affording definite epidemiological data on any subject, the statement made by Asst. Surgeon Parker as to plague that " no cases were imported " in the higher altitudes although " they occurred in the country surrounding Guayaquil " is noteworthy in contrast with a recent expansion of the rat flea theory (Ninth Report of the Indian Plague Investigation Commission).

Fumigation of Ships.

S. B. GRUBBS, Surgeon U.S.A. Public Health Service, has carried out experiments with fans for getting rid of sulphur dioxide or hydrocyanic gas employed for fumigation of holds of ships as a part of anti-plague measures, with the object of diminishing the time of refraining from loading. He states (*Public Health Reports*, 1917, Oct. 19, p. 1759) :—

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* Jamaica. Annual Report of the Superintending Medical Officer, for the Year ended 31st March, 1917. 1917. Jamaica: Government Printing Office. p. 43.

† Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1917. 1917. Washington: Govt. Printing Office. p. 114.

> "Electric blowers possess little power and the wires are troublesome to handle, consequently they have been abandoned in favor of a gasoline driven air propeller designed to propel boats and sleds. This is a two-cylinder, two-cycle, air-cooled, 3-horse-power gasoline engine, driving a two-blade propeller, 32 inches in diameter, at about 1,600 revolutions per minute. According to measurements made at this station it delivers about 22,700 cubic feet of air per minute. This fan has been tried within the holds, where it served the double purpose of circulating the gas and increasing its penetration. . . . It will be seen that this machine will in 10 minutes deliver into the bottom of the hold an amount of air equal to the aerial content of the average ship's hold, but it has been found that gas is rarely expelled in this short time sufficiently to make the hold safe for persons entering.
>
> "The original vertical machine has at our suggestion been changed so that it will operate in a horizontal position, thus driving the air directly downward. Mounted on a wooden frame the horizontal machine weighs less than 100 pounds and may be easily hoisted aboard a vessel. When operated it is placed across the corner of an open hatchway and may be carried from one place to another without stopping the motor. Furthermore, it may be used with or without a shute. In holds of less than 30 feet depth it is probably as efficient without as with a shute, but as this latter can be easily attached by means of four snap hooks it may be advisable to use it when the hatchways are small and the holds deep. Anemometer readings at the bottom of an 18-foot shute gave approximately 8,500 cubic feet per minute and practically the same reading was obtained when the anemometer was held the same distance beneath the machine without the shute."

TYPHOID.

Chronic Carriers.

Public Health Reports for Oct. 19, 1917, p. 1755, in an account of a milk-borne typhoid epidemic (by C. F. BOLDUAN and C. KRUMWIEDE, Jr., Department of Health, City of New York) affords an instance of difficulty in identifying a "carrier," should there be failure at the time of examination to excrete typhoid bacilli. They state :—

> "We were in error, therefore, because the carrier first found was a normal carrier, a fact unsuspected at the time. The presence of such a carrier raises interesting possibilities. Had we relied wholly upon the Widal reaction for the selection of fecal specimens and had S.M. given positive fecal results at the time, we would have excluded him and agreed to the resumption of the milk supply Should L.M. have continued to excrete bacilli, the excretion by normal carrier being not necessarily as transient as it was in his case, we should have left an unsuspected carrier, who might have been the source of infection for subsequent cases.
>
> "Although a positive Widal reaction may be absent in chronic carriers, the results indicate that even if a farm helper is found to be excreting typhoid bacilli, any other individual giving a partial or positive Widal reaction should be held under suspicion. At least, fecal examinations should be made over a period of time, as excretion even with chronic carriers is intermittent and negative examinations are not infrequent, and may extend over months or even for a year."

Food Preparation and Typhoid.

The Government Pathologist, Jamaica (Dr. H. H. SCOTT), in his Report to the Superintending Medical Officer for 1917 (Annual Report of the Superintending Medical Officer, Jamaica, 1917) affords remarks showing that the use of Widal's reaction "is a wise precaution" in safeguarding the preparation of food. "Examinations as to bakers and others in analogous employments being possible carriers of disease are made prior to the men being employed for such purposes and, as a preliminary, the blood is sent up to be tested for agglutinin formation." 1,302 sera were forwarded for examination: of these 37·40 per cent. were positive, 56·30 negative and 10·25 per cent. doubtful. He adds that sera from 71 apparently healthy subjects at the Penitentiary gave 18 positive results.

LEPROSY.

In the Report of the Health Officer (Dr. J. E. THOMSON), Brisbane, embodied in the Annual Report of the Commissioner of Public Health, Queensland, to 30th June, 1917, the total patients stated to be under treatment for leprosy was 43, as follows:—White males, 14; white females, 2; coloured males, 25; coloured females, 2.

The male coloured inmates were South Sea Islanders, 12; Chinese, 1; Japanese, 1; aborigines, 8; half-caste, 4; Kanaka, 1. The character of leprosy found is defined as "nodular leprosy" and "mixed leprosy."

No other treatment but that with chaulmoogra oil was pursued. He justifies adherence to this method on the ground that [p. 12] "many cases have benefited by its use, and any new substance will have to prove its merit before it can hope to displace the remedy in the treatment of the disease with a reputation extending over so many years and the high percentage of improvements." He adds that this method was first adopted by BLANE of New Orleans in 1888. [At page 530, Vol. 6, No. 9, Dec. 15, 1915 (Sanitation Number), of this *Bulletin* reference is made to the use of gurjun oil. This was introduced in Madras in 1876 by Surgeon Major DOUGALL, I.M.S., to whom would seem to belong precedence in treatment of leprosy by this class of oils.]

PNEUMONIA.

Jamaica.—Dr. Lawson GIFFORD, in his Report embodied in that of the Superintending Medical Officer, Jamaica, p. 23, gives reason for regarding the health conditions of the Kingston Medical District as unsatisfactory. In 1915–16 the death rate per mille was 25·36, in 1916–17, 34·12; whilst in March of 1917 "the death registration reached the enormous figure of 61·50 per 1,000." After remarking on the increase of malaria, typhoid and bowel complaints as contributing to the increased mortality, he furnishes the following remarks as to pneumonia, "which from 69 notifications with 61 deaths in 1915–16 increased to 307 cases with 114 deaths." In reference to these figures he states [p. 24]:—

> "What is the explanation? The Medical Officer of Health for Kingston in his report to the Mayor and Council for January suggests the 'possibility of a virulent strain of Pneumococcus* having been introduced from Halifax by home coming convalescents of the Third Jamaica Contingent.' Personally I am not prepared to go so far afield to look for the cause of the trouble. I think the two main, if not sole factors, are to be found in meteorological conditions and poverty, both combining to lower the vitality and restrict the resistive powers of the community. This idea is borne out by the increased incidence of the disease during the last (March)

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* On this subject, see *British Medical Journal*. 1918. Jan. 12. p. 57.

> quarter of the year concurrently with the violent diurnal changes of temperature (cold nights following hot days) that obtained during those months. The role played by poverty involving insufficient food if not actual starvation, and scanty clothing is obvious. Be the cause what it may there can be no doubt that the prevalence of Pneumonia in the city is a serious matter."

Dr. GIFFORD regards the increased poverty of the population as "a distinct reflection of the war."

Bengal Jails.—In his Report for 1916 the Inspector General of Prisons, Bengal Presidency, makes [p. 20] the following reference to increased incidence of pneumonia :—"The slight increase in the ratio of admissions from pneumonia is well explained by the considerable overcrowding, as pneumonia is above all diseases one of overcrowding."

FOOD.

Fixed Diets.

At page 271, Vol. 6, No. 5, Sept. 15, 1915 (Sanitation Number), of this *Bulletin*, on the adjustment of proteids to carbonaceous items of diet in the Bengal dietary as advised by McCAY, the Inspector General of Prisons, Bengal (Lt.-Col. W. J. BUCHANAN, C.I.E.), is quoted as stating that whilst he agrees with the arguments of that worker, he held that to secure the result desired (that is, a change of diet that would be received with favour) it was necessary to render the new scale voluntary, until its benefits were fully appreciated. In his Administration Report on the Jails of the Bengal Presidency for 1916 [pp. 18–19] he makes the following remarks on progress secured :—

> "A large number of the present-day Superintendents are conservative in their views and seem to think that the rice diet was ordained by Providence for Eastern Bengalis, but on the whole substantial progress has been made.
>
> "As regards actual results, taking the whole jail population of this Presidency, we find that of the prisoners on wheat diet 56 per cent. gained in weight as compared with 53 on Bengal rice diet. As regards sickness we find that while only 45 per cent. of all admissions to hospital came from those on wheat diet, there were 63 per cent. from those on rice diet; and as regards the incidence of *bowel-complaints* we find (as I have preached and predicted) that of the wheat-dieted prisoners only 12 per cent. suffered from bowel-complaints (dysentery and diarrhoea) as against no less than 22·7 per cent. of those of Bengal rice diet.
>
> "I still think therefore that no compulsion should be used and no violent change in the dietary. The superiority of the wheat-scale diet is becoming known and appreciated, but there still exists an older school of Medical Officer and Medical Subordinate who cling to the view that rice is the natural diet of the inhabitants of Eastern Bengal."

[The Jail population forms but a small portion of the total of the Bengal Presidency. It is however largely derived from the poorer and working classes, where the custom of regarding rice as the essential article of diet has long proved inimical. It would therefore seem possible that, in due course, as increments of men converted under Col. BUCHANAN's policy as to their opinions on dietary are restored to the free population, McCAY's advice may be more widely accepted by the people to their physical advantage. In the Madras Presidency, where although rice is largely grown for commercial purposes and wheat is rare, the staple cereals chiefly used by the poorer classes are millets, the labourer, as a matter of experience, regards rice as a luxury, but recognizes that if work is to be faced the millet affords better staying powers—as indeed their better proportions of proteids to hydro-carbons would imply.]

WATER.

Water Supply and Health.

The Madras City was credited in 1872 with having a public water supply. The catchment area was not preserved by legislation and was year by year subject to increasing risks of contamination, whilst this was still more obvious as to the open channel conveying the water from the impounding reservoir to the point of distribution, absence of filters, etc. Its insufficiency led a considerable section of the people to the employment of sanitarily undesirable wells as an additional source of supply. Under such circumstances, it is not surprising it has been a difficult task for the Corporation to prove the sanitary advantage of water works.

Although under a new scheme the advantage of completed works and distribution cannot yet be claimed, the President of the Corporation, in his Report for 1916–17 is able to furnish the following figures* :—

"In the last Administration Report attention was drawn to the remarkable fall in the death-rate which followed the introduction of the new water-supply in December 1914. It is satisfactory to record that during the year under review there has been a further decline, and the improvement in health has been sufficiently noticeable to call for remarks from employers of labour. The actual figures are so striking that they are worth recording ; they are as follows :—

Year.	No. of deaths in the year.	Death-rate per 1,000.	Remarks.
1914 . . .	24,174	46·6	
1915 . . .	18,683	36·0	First year of new water-supply
1916 . . .	17,872	34·4	
Average for decade 1901-10 .	22,485	44·0	

"The drop in the number of deaths per year is indeed remarkable After a continuous though irregular rise in the death-rate, it has fallen below the lowest previously recorded.

"Compared with the average for the previous decade there is a reduction of 4,613 deaths per annum. As for each death there are on the average six cases of illness, each lasting seven days, the fall in the death-rate results in the saving of 193,746 days of sickness. From a financial point of view, each day may be taken as worth Re. 1 including loss of wages of the sick person, the medical attendance and time of those who attend on him. Thus the value of the improved health of the city may be taken as Rs.1,93,746 per annum, a large proportion of which may be set down to the credit of the new water supply.

The Sterilization of Water.

An urgent requirement in the tropics to the traveller in mufti or khaki, in peace or in war, is the easy and rapid sterilization of drinking water. No one has given the subject such earnest and constant attention with so favourable results as Major NESFIELD, I.M.S. In recounting progress made on this subject, he recalls the fact not usually remembered that it is due to his initiative, in 1903, that chlorine and hypochlorites have now general acceptance as agents of the first importance. He states :—" The form in which I originally put forward chlorine was the liquid gas in steel cylinders for large quantities and bleaching powder for smaller quantities. The water was dechlorinated with sulphite of soda, and later with hyposulphite."

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* Administration Report of the Corporation of Madras for 1916–17. Madras: Thompson & Co. pp. 29–30.

He insists that all doubts as to utility of chlorine and resulting sterility must disappear before the standing rule that " if free chlorine (nascent oxygen) or iodine can be shown to exist in water by the potassium iodide and starch test the water is sterile." As to quantity of chlorine required, he quotes Major C. R. DURNALL, Medical Corps, U.S.A., in *Journal of the American Public Health Association*, Nov., 1911 :—" In general it may be said that with an average unfiltered river water such as that of the Potomac about 1 in 2,000,000 parts of chlorine are required. For clear lake waters 1 in 3,300,000 parts of chlorine will be sufficient; i.e., it will require 3 to 4 pounds of liquid chlorine for a million gallons of water of average purity." As to length of contact necessary Major DURNALL states that the action is *practically instantaneous.* Major WESTFIELD makes " starch iodide testing fluid by adding 5 grains of starch to 1 ounce of water and boiling till dissolved. When cool add 5 grains of potassium iodide, 5 grains of zinc sulphate and 5 grains of alum. The object of the zinc is to prevent the formation of dextrine. The alum makes the test more sensitive."

He maintains that the employment of chloride of lime for Army purposes and individual use is unsuitable* because it is unstable and its composition unreliable. He condemns its employment in the tropics, and in practice he considers its use in Mesopotamia conduced to inefficiency. For utilization in Municipalities in hot climates, he would advise the formation of solutions of hypochlorites by electrolysis [see this *Bulletin* (Sanitation Number), Vol. 8, No. 5, Oct. 15, 1917, p. 307].

For the private individual or soldier, he considers the only logica chlorine compound is chlorogen. This is sodium hypochlorite combined with 1 per cent. sodium hydrate. Major NESFIELD states that this is now made in India on a large scale, by the following process† :—

> " Freshly imported chloride of lime is well macerated with water, and a clear concentrated solution of calcium hypochlorite produced.
>
> " $Ca(OCl)Cl + H_2O = Ca(OCl)_2 + CaCl_2 + H_2O$.
>
> " This fluid is then freed of impurities and particularly chloro-oxy compounds other than NaClO, and titrated till it contains 6 per cent. available chlorine. It is then treated with sodium carbonate till all Ca *is* precipitated.
>
> " Thus $Ca(OCl)_2 + Na_2CO_3 = 2\ NaClO + CaCO_3$.
>
> " This fluid is again titrated to ensure the presence of 5 per cent. available Cl, and to it is then added NaOH to make a 1 per cent. dilution.

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*See this *Bulletin* (Sanitation Number), Vol. 6, No. 5, Sept. 15, 1915, p 266.

† *Indian Medical Gazette*, 1917, Oct., Vol. 52, No. 10, pp. 355-356.

"This fluid has remarkable solvent properties, and dissolves cork, wood, leather, etc., but does not dissolve glass, porcelain, or rubber, and hence can be kept in suitable stoppered bottles.

"It has a faint sweet smell suggesting chloroform."

For general and military purposes, he advises 2 drachms of chlorogen to 100 gallons water, allowing for 30 minutes contact. But here he would safeguard the attainment of sterilization, by requiring that the treated water must give a blue with potassium iodide and starch at the end of half an hour.

Interstate Water Supplies.

Nature as well as man is capable of diverting the course of huge watercourses, but the latter is usually content to utilize these as found. In that case, selfish instincts or thoughtlessness of communities in the upper tracts of a river's course frequently influence inimically utilization of water for domestic purposes in the lower tracts. Chiefly, such results are due in already developed countries to lack of that information which sanitary science, especially as aided by its branch of bacteriology, in the present day, is capable of affording. In these countries the rival interests of communities have their outlets in Commissions, Committees, expert "findings," and much legal procedure between official local bodies whose rule of petty areas is conterminous. There is here the excuse of difficulty of breaking the bonds of vested interest.

But, in countries in the tropics now under development, if ordinary foresight be employed, interests should not become so "vested" as to be detrimental to the public health. To effect this, it is well that in the course of development Sanitary Services in the tropics should always guard their position under Central Governments and, whilst not restraining reasonable self-government evolution of Local Bodies should urge that sufficient power of control to secure co-ordination be definitely retained. In certain of our Colonies and in India these principles are in force (largely because Local Bodies derive their origin from Government) but are liable in the course of changing conditions to lapse in favour of excessive devolution.

The Annual Report for 1917 of the U.S.A. Public Health Service gives (p. 235) excellent instances in respect to the protection of water-supplies, of the advantage of Interstate over-rule. The Note opens with recognition of the well acknowledged fact that whilst a periodical bacteriological examination may [by a chapter of coincidences] warn of dangers, the real test of safety is "sanitary surveys at periodical intervals of the watersheds from which supplies are derived." These have now been made obligatory, and certificates in a form showing results of both the sanitary survey and bacteriological analysis are submitted periodically.

This ruling especially aims at protection of passengers passing from State to State, and therefore concerns water-supplies provided on railways and vessels. Of 3,713 waters examined of a total of 4,156, 211 were certified to be "polluted." As a proof of the efficacy of sanitary organisation on the "large map" principle, as against each community being a law unto itself, it must be gratifying to the Massachussetts State Board of Health (which long held the lead in scientific study of water supplies and sewage disposal) to find that "the low percentage of pollution* in Massachussetts can be attributed to the fact that that State has exercised absolute control over all water supplies for many years, and has amply protected all public watersheds."

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* The total water-supplies concerned was 64; not one was found "polluted"

SANITARY ORGANISATION.

SANITARY STAFFS.

If the Sergeant is the "backbone of the British Army," it can safely be said that the Sanitary Inspector is the backbone of any organization dealing with the health of communities. "A turban however does not make a Mohammedan," nor does a duly notified appointment by a Public Body create a Sanitary Inspector. To be of any real utility the man must have acquired a sound general education; in dealing with obstructive members of a community he must possess sufficient discretion to appreciate the advantage of an *arte non vi* policy; and have had an education in sanitary science and sanitary legislation that will enable him to be above mere "rule of thumb" methods. These qualities are requisite in European countries; but in the tropics, he must possess additional virtues. The chances are always that he will be required to deal with large areas for the quick supervision of which riding is requisite, and that to make his requirements understood an acquaintance with more than a single vernacular language is necessary. In localities where the superior engineering staff of the Government or Local Bodies concerned is largely engaged in Major Works in connection with communications, buildings and irrigation, it is essential in rural areas that he should have sufficient knowledge of construction and sanitary engineering to secure that Minor Works should be designed, estimated for and (subject to sanction beyond a specified sum) executed under his care. In the case of India, to these requirements must be added, a sound knowledge of races, caste systems and religions. Here, further, the peculiarity arises of its being desirable that a Sanitary Inspector be of the race, caste* or religion numerically predominant in the locality in which he serves.

The ideal may not always be attained, but it is indubitable that, in the well educated classes of Madras Indians, there is available for service in the tropics excellent material of the character required. Forty years back to have suggested to a Brahmin that he should inspect a slaughter-house where cattle are slaughtered, handle the beef and pronounce as to its quality, or make sure that a latrine used by Pariahs was correctly cleansed, would have been met with indignation. In the present day, both high caste Hindus and Mohammedans willingly qualify as Sanitary Inspectors at their own expense and are capable of exhibiting zeal and keen interest in their profession.

The extent to which the technically qualified Sanitary Inspector is recognized in the Madras Presidency makes, indeed, a sharp contrast to conditions (outside the Metropolis) still existing in the United Kingdom. In his Report for 1916, the Sanitary Commissioner for Madras (Lt.-Col. JUSTICE, I.M.S.) makes the following observations as to the number of qualified Sanitary Inspectors available, and of those in actual public employment†:—

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* Or, in the alternative, be of a caste commanding respect in the locality. In 1909, 65 per cent. of the Sanitary Inspectors, Madras Presidency, were Brahmins.

†Madras. The Fifty-Third Annual Report of the Sanitary Commissioner. 1916, 1917. Madras: Printed by the Superintendent, Government Press. p. 20.

> "Two candidates qualified as second-class health officers and fifteen sanitary inspectors in the employ of local bodies underwent the quinquennial course and passed the prescribed examination during the year. From the Assistant Sanitary Inspectors' class in the Medical College ten men qualified; thirty-three assistant sanitary inspectors obtained certificates as qualified sanitary inspectors by passing the examination in Minor Sanitary Engineering under the Sanitary Engineer to Government. Twenty-three men qualified as vaccinators and thirty-nine candidates deputed by Collectors of districts were trained as special plague inspectors for plague duty. Out of a total of 979 qualified sanitary inspectors and assistant sanitary inspectors, 680 are employed in municipalities and district boards on sanitary duty, 86 as deputy inspectors of vaccination and 40 on the provincial cholera reserves."

SANITARY INSPECTORS.

It is possible that a statement of the method of education and discipline of the Madras Sanitary Inspectors, referred to in the preceding Note, may be of some utility to those about to inaugurate schemes for employment of Sanitary Inspectors elsewhere in the tropics. In regard to education, as the sanitarian would largely adapt this to suit local requirements and the class of men dealt with, it is unnecessary to do more than afford an outline.

In regard to discipline, it will be understood that the rulings were intended for a class of men who are officially recognised by the Local Government and by all Local Bodies, and that no Sanitary Inspector, after 1894, could be entertained by a Local Body or Government Official in any part of the Presidency, unless he possessed a certificate of qualification of the nature prescribed by Government rulings. Yet it was not an embodied Service. That ideal could not be secured on account of financial and self-government legal rulings. Consequently, the rules had to be so framed that when a Local Body entertained a Sanitary Inspector he was their servant, yet was still answerable to the Medical and Sanitary Officers of Districts and to the Sanitary Commissioner as to his professional fitness and conduct. The method excogitated for maintenance of discipline, therefore, is analogous to the registration of medical men in the United Kingdom, with the difference that the Sanitary Commissioner as the registering authority assumes an active, not a passive, interest in conduct, and in securing for a candidate, or preventing, his employment. He also has the power to investigate charges made by Local Bodies, and afford protection when necessary. In aid of these powers, the Certificate of qualification was endorsed to the effect that it was "the property of the Sanitary Commissioner for the time being." Withdrawal of a Certificate and therefore the annulling of the power of a Local Body to entertain the Sanitary Inspector concerned was practised, temporarily, for failure to show at periodical examinations that knowledge had been maintained, or, permanently, for conduct likely to prejudice fitness for the public service. From the latter decision, the Sanitary Inspector held the right to appeal to Government. The Sanitary Inspector is thus rendered reasonably safe from the whims of Local Bodies, as well as from a too autocratic attitude of a Sanitary Commissioner.

The Official Register of Sanitary Inspectors maintained n the office of the Sanitary Commissioner was more than a mere statement for identification and date of qualification of individuals; it was so arranged that the caste and race, age, qualifications by examination other than sanitary (which are often of a high class), history of service and conduct, good and bad, could at once be traced.

In all countries the Sanitary Inspector requires a "Sanitary Conscience" that is proof against many forms of temptations to debase his sense of duty; in localities where certain classes of Orientals are dealt with, this is especially so. Under the safeguard stated, the experience of the last 23 years shows that the Madras Presidency Sanitary Inspectors, as a class, have proved themselves zealous and trustworthy public servants.

One of the advantages of the method has been that it was possible for the Madras Government Sanitary Commissioner in epidemic periods to entertain temporarily, at Government expense, on less than normal full pay, a Reserve of Sanitary Inspectors who could at a moment's notice be dispatched for duty in threatened or attacked areas under Local Bodies, by whom their pay was met. This method of retaining a certain number of men under control saved much time, which might be lost by Local Bodies in securing unemployed Sanitary Inspectors.

The following extracts from the official pamphlet published [for sale] for public information by the Government Printing Office, Madras, deals with the chief points above alluded to.* The pamphlet contains the full syllabus of education.

> "The scheme for the training of Sanitary Inspectors was sanctioned by Government in December 1894, and the first class for Sanitary Inspectors assembled in the Medical College, Madras, in January 1895. The general educational qualification for admission to the class was a pass in the Matriculation or any higher examination, but a certain number of unpassed candidates were also admitted on the nomination of the Sanitary Commissioner. Also unqualified Sanitary Inspectors in the service of local bodies and having less than five years' standing, whatever their educational qualification, were required to qualify within two years or be discharged. The training consisted of theoretical instruction in the Medical College, extending to three months from January to March, and a practical course extending through April. Men who qualified under the above rules are known as Certificated Sanitary Inspectors.†
>
> "2. The examination prescribed for those wishing to qualify as Sanitary Inspectors was the Government Technical Examination in Hygiene (Intermediate Grade) modified by the Director of Public Instruction, in consultation with the Sanitary Commissioner, to suit the special requirements. Subsequently, Elementary Physiology was added as part of the course of instruction; but no compulsory examination was held.
>
> "3. In 1903, the scope of the examination and training was enlarged. Under the new rules the nomination of unpassed candidates ceased, and none but those who have passed the Matriculation Examination of the Madras or any recognized University, the Upper Secondary, or any higher examination, are admitted to the Medical College. Admission is also conditional upon candidates being of good character, certified by the Head of their Schools or Colleges, or their employers.

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* Rules for the Education and Discipline of Sanitary Inspectors, 1912. Madras: Printed by the Superintendent, Government Press.

† To secure up-to-date knowledge, employed Sanitary Inspectors passed annually a written and oral examination conducted by the District Medical and Sanitary Officer of the area concerned. If results were bad the Sanitary Inspector was "warned" by the Sanitary Commissioner, and required to appear again in three months; if then still bad, his certificate was temporarily suspended till improvement was secured. On the other hand, when results were good the Sanitary Inspector was praised accordingly. Local Bodies were requested to supply suitable current Sanitary literature to their Sanitary Inspectors.

"4. The course in the Medical College, Madras, extends from July to December, and consists of theoretical and practical training in General Hygiene, Physiology and Bacteriological Demonstrations under the Professor and Assistant Professor of Hygiene. Outdoor practical teaching is undertaken by these officers assisted (voluntarily) at times by the Health Officer, Madras. . . .

"5. Candidates who qualify under the above rules are known as Assistant Sanitary Inspectors.

"6. The examination prescribed for Assistant Sanitary Inspectors is the Government Technical Examination in the Intermediate Grade in Hygiene and in Physiology, and is conducted by the Commissioner for Government Examinations. The fee for registration is Rs. 4. No candidate will be permitted to appear for it unless he produces a certificate from the Principal, Medical College, of having undergone the five months' theoretical and practical course in the Madras Medical College. The written examinations consist of two papers of three hours each in Hygiene (one of a theoretical, the other of a practical, tendency) and one of three hours' duration in Physiology. There are also oral and practical examinations in the above subjects.

"7. Candidates who are desirous of qualifying for the higher grade of Sanitary Inspector must, in addition to passing the examinations for Assistant Sanitary Inspector as above described, undergo a course in Minor Sanitary Engineering at the Sanitary Engineer's Office, Madras, which extends to five months, viz., from January to May.

* * * * *

"9. The examination in Minor Sanitary Engineering is conducted by the Commissioner for Government Examinations, but no candidate will be permitted to appear unless he produces a certificate from the Lecturer in Minor Sanitary Engineering of having undergone five months' training in the class specially held for the purpose at the Sanitary Engineer's office. The fee for registration for the examination is Rs. 4.

"10. Candidates who duly pass the examination for Assistant Sanitary Inspectors will be given two certificates—one by the Commissioner for the Government Examinations, in token of having passed the Government Technical Examination (intermediate grade) in Hygiene and Physiology, and another conjointly by the Surgeon-General and the Sanitary Commissioner. *The latter certificate is the token of qualification.* A person not possessed of this certificate and whose name does not appear in the *Quarterly List of Sanitary Inspectors, which is published under the authority of Government, is not entitled to hold an appointment under any public authority in the Madras Presidency. The certificate is granted only to those who have passed the examination after undergoing a course of study in the Medical College, and its grant is conditional on the candidate being of good character and physique. It is the property of the Sanitary Commissioner for the time being, and is liable to be cancelled or suspended by him in case of misbehaviour. Whilst in the employ of a local body, the certificate should be lodged by the Sanitary or Assistant Sanitary Inspector concerned in the office of the District Medical and Sanitary Officer; when not so employed, it is held in the private possession of the Sanitary Inspector. On securing employment, the Sanitary Inspector should not only report himself to the local body paying for his services, but also through that body to the District Medical and Sanitary Officer, sending, at the same time, his certificate. [The certificate of qualification exhibits rulings on these points on the reverse.]

* * * * *

"12. With the view of ensuring that Sanitary Inspectors in the employ of Local Boards and Municipal Councils maintain their efficiency and keep themselves informed of advances in Sanitary Science, these subordinates will be afforded additional teaching in the shape of a course of lectures and demonstrations in the Medical College. This additional course of training and examination will be regulated by the following rules :—

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*" Obtainable from the Superintendent, Government Press, Madras, by any person on payment of As. 12. It is of great importance that each Sanitary Inspector should provide himself with a copy."

“ (1) The examination shall be compulsory at the end of every five years' service of each Sanitary Inspector and every such Sanitary Inspector shall attend the prescribed course and go up for the examination at the end of the course.

“ (2) The course will extend over a period of eight weeks and will be held during the summer vacation of the Medical College. The exact date will be notified in the *Fort St. George Gazette.* Assistant Sanitary Inspectors are not eligible for admission.

“ (3) The course will consist of two parts :—

“ (1) Sanitary Engineering. . . .

“ (2) Higher sanitation of a practical nature [instruction being given by the Sanitary Commissioner and the Deputy Sanitary Commissioner.]

“ The syllabus in these subjects will be identical with that for the special course for Assistant Surgeons qualifying for the posts of Sanitary Assistants to District Medical and Sanitary Officers.

* * * * *

“ (6) To enable Sanitary Inspectors to undergo their training and pass the examination, they should be granted leave for a period of twelve weeks with full pay, and their actual travelling expenses to and fro should be borne by the local body concerned. Sanitary Inspectors who, owing to failure, have to attend the course and appear for the examination a second time will do so at their own expense and on leave without allowances ; and should they again fail, their services will be liable to be dispensed with and their conjoint certificates of qualifications issued by the Surgeon General and the Sanitary Commissioner will be suspended until such time as they prove their fitness by passing the examination.

* * * * *

“ 13. The designations of Assistant Sanitary Inspector and Sanitary Inspector are strictly confined to those who have qualified as above and are not applicable to Nuisance Inspectors, Conservancy Overseers, etc.— Sanitary Inspectors should, through the employing bodies, bring to the notice of the Sanitary Commissioner any instance where the term of Sanitary Inspector is used by unqualified persons. *Both the honour and the use of these designations should be jealously guarded by those possessed of them.*

* * * * *

“ 15. Men qualified as above are eligible for permanent employment as Sanitary Inspectors or Assistant Sanitary Inspectors in Municipalities or in Local Fund areas, and for temporary employment during fairs and festivals, or on the occasion of epidemics ; as rural Observation or Preventive Circle, Disinfection or Divisional, Inspectors on plague duty ; also as Deputy Inspectors of Vaccination, provided they have also undergone training and examination in Vaccination at the King Institute of Preventive Medicine, Guindy, in the following subjects :—

Subjects.	Number of lectures.
(1) Preservation and Bacteriology of Vaccine, and the Science of Asepticism	6
(2) Human and animal vaccination (theoretical). Official routine and law concerning vaccination	12
(3) Common skin and other diseases of man (theoretical)	8
(4) Human and animal vaccination (practical)	Daily for 3 months
(5) Common skin and other diseases of man (practical)	
(6) Common skin and other diseases of animals (theoretical)	8

“ 16. No local body should newly employ any person as a Sanitary Inspector or as an Assistant Sanitary Inspector who does not hold the following certificates :—

“ (i) A certificate of having qualified under the above rulings ; (ii) in the case of an Assistant Sanitary Inspector a certificate from the Sanitary Commissioner that he can cycle ; (iii) in the case of a Sanitary Inspector, a certificate from the Sanitary Commissioner that he can both ride and cycle.

"17. All appointments of Sanitary Inspectors are made by Municipal and Local Fund authorities, subject to the Sanitary Commissioner's approval as to character. This should be formally sought before giving the candidate an appointment. Selections should be made from the Quarterly List of Sanitary Inspectors published every quarter by the Sanitary Commissioner, which is circulated to local bodies. Government also expects that these bodies will seek his advice as to choice of men, in respects to fitness for the particular appointments concerned. The appointment by local bodies of any person whose name does not appear in the Quarterly List of Sanitary Inspectors, or who has not been approved as to character by the Sanitary Commissioner, will be brought to the notice of Government by the Sanitary Commissioner.

* * * * *

"22. Sanitary Inspectors are entitled to all the advantages as to leave, etc., possessed by other officers in Local Fund or Municipal employ.

"23. To maintain discipline among Sanitary Inspectors, a register is maintained in the Sanitary Commissioner's office in which is recorded everything in favour of or against a Sanitary Inspector as reported by employing officers, and as a result of observation by District Medical and Sanitary Officers, the Deputy Sanitary Commissioner and the Sanitary Commissioner. The Sanitary Commissioner is empowered to remove from the register any Sanitary Inspector who has misbehaved himself, and to cancel or suspend his conjoint certificate according to the gravity of the offence. During the temporary suspension of the certificate, the employment of the Sanitary Inspector under any public authority is prohibited. It is, however, open to any one whose name has been removed from the register to appeal to Government, through the Sanitary Commissioner, against the decision of that officer.

* * * * *

"25. To secure employment, candidates should register their names at the office of Sanitary Commissioner, giving the following information. Any change of address should at once be intimated :—

"(a) Age ; (b) languages known and whether knowledge is colloquial only or extends to reading and writing ; (c) examinations passed ; (d) where employed and length of service in each capacity ; (e) date of appointment in present post ; (f) permanent address ; (g) father's name and profession.

"26. Local authorities will be supplied with information as to candidates on application.

"27. To enable the Sanitary Commissioner to meet the requirements of Government as to the maintenance of a register, all local authorities employing Sanitary Inspectors are requested to intimate to the Sanitary Commissioner any matter in favour of or against their conduct, and the date of first joining and giving over charge of an appointment."

RAILWAY LABORATORY CAR.

In aid of the Interstate supervision of water-supplies, the U.S.A. Public Health Service is employing a Railway "Sanitary Car" known as the "Wyman," in commemoration of the late Surgeon-General Walter WYMAN. This is a remodelled Pullman carriage which was completely equipped as a laboratory, adequately provided with every appliance for routine bacteriological investigation. This car also "contains an office, officers' and attendants' sleeping quarters and toilet rooms, and a kitchen and dining-room. It is lighted by electricity which also furnishes energy for driving fans and for heating an incubator." Irrespective of examination and record of results of sanitary surveys and bacteriological examination of 81 water-supplies, the car has proved of utility in an outbreak of cerebro-spinal fever. "The movements as a rule average about 50 miles, and the car lies at one point for from 24 to 72 hours."

The advantage of a Government Sanitary Service in the tropics possessing cars of the nature adopted by the U.S. Service is obvious, not only with reference to sanitary and bacteriological investigation in areas threatened by epidemics, but also in supplying *materiel* for public lectures where it is believed the procedure is likely to enlist popular aid.*

DELOUSING A POPULATION.

Under Interstate Regulations preventive efforts against the importation of typhus from Mexico were instituted during 1917.† Travel by rail from El Paso by the Mexican labouring class or their families was not permitted, "unless they were provided with a certificate showing that they had been deloused, bathed, and vaccinated, and that their clothing and baggage had been disinfected." From the date of this ruling being enforced, no cases of typhus in the United States have been traced to El Paso.

The Mayor and Council of the City of El Paso welcomed measures for the repression of typhus. Under Asst. Surgeon J. W. TAPPAN, a scheme for delousing of the population was inaugurated. He secured a motor-driven omnibus and, with an Inspector of the Department of Health, made frequent visits each day to crowded Mexican tenements, conveying louse-infested persons and their personal effects to the service disinfecting plant where they were deloused. This measure resulted in a marked improvement "not only from the actual number treated at the plant but in stimulating all other Mexicans to bathe and boil their clothing so as to avoid being carried away for official delousing." These efforts were ultimately added to by issue of an ordinance regulating habitation of tenements and cheap lodging houses. A proposal to open free bathing houses and laundries fell through from lack of funds.

INTERSTATE SANITATION.

Bolshevism in sanitation must be as hopeless of success under strain of circumstances as in politics. The smallest village community in a civilized nation cannot make rulings for its own protection against disease, without adapting these to the fact that its duty to self and the nation of which it is a unit is not limited by the village boundaries. *Sanitas suprema lex* may demand sacrifices of convenience or finance in obedience to the sanitary axiom that the minority must suffer for the majority. In the absence of organizations (supported by legislation and public funds) recognizing a common sanitary interest and sufficing to secure united efforts under a central Government sanitation may, according to some definitions, exist, but "prevention which is better than cure" *cannot*. It is in recognition of such facts that Great Britain is approaching the necessity for a Ministry of Health. In America, the United States Public Health Service is Federal in administration; abroad, its Medical Officers and American consuls man its outposts which supply rapid intelligence of disease movements. In its relation with the various States, it keeps touch with their respective health conditions and, whilst refraining from curtailing independence of action, arranges for affording material aid and guidance the moment interstate health is imperilled. In this spirit, the Interstate Quarantine Regulations of 1916 have been added to under an order approved (January 1917) by the United States Government Secretary of the Treasury, requiring that for sanitary administration purposes "no single State would be in more than one [sanitary] district."

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* Major JUSTICE, I.M.S., Sanitary Commissioner with the Government of Madras, has inaugurated a system of popular lectures illustrated by lantern slides. These, in form authorized by him, are delivered by Indian Assistant Surgeons.

† Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1917. Washington: Govt. Printing Office. p. 226.

Nor is it solely between States that this policy of co-ordination has been pursued. It is evident that permanent camps for troops under training, during the present war, must be placed in positions best suited for military purposes, and irrespective of whether legislation affecting the neighbouring civil population is suited to rural or urban necessities. Hence the necessity for a zone within which the civil population shall be required to conform to rulings which have for their purpose the protection of the health of the military population suddenly imported into their midst. Under the title of "Extra Cantonment Zone Health Legislation" suitable rulings have been framed (*Public Health Reports*, Dec. 7, 1917, p. 2079). These cover in considerable detail such subjects as venereal diseases, prohibition of disorderly houses, the sanitary care in production and sale of food stuffs, barber shops and hairdressing establishments.

SANITARY DWELLINGS.

To finance by a loan, recoverable as a tax on the security of a building, "private improvement expenses" is a procedure of great value, sanctioned by the Public Health Act of England, which should have considerable scope for utilization in tropical Municipalities. A proposal of kindred nature in the Report by the Government of Bombay on "Municipal Taxation and Expenditure in the Bombay Presidency for 1915–16" [p. 17] is thus referred to:—

> "It may be of interest to note that the question of granting loans to municipalities and building societies registered under the Co-operative Societies Act, 1912, for the encouragement of house building on approved sanitary lines was considered by this Government in 1914–15 in view of a suggestion conveyed in a resolution moved by the Honourable Rao Saheb V. S. Naik at a meeting of the Legislative Council. One of the proposals submitted to the Government of India on the subject was that whenever the state of the finances permitted, advances should be placed at the disposal of municipalities, under the Local Authorities Loans Act, to enable them to finance schemes for the erection of dwellings on the areas developed by them, such advances to be conditional on the adoption of a prescribed standard of sanitation in the construction of these buildings. In view, however, of the present financial situation, the Government of India have decided to defer the further consideration of this proposal."

TOWN DEVELOPMENT IN EGYPT.

A reprint from the "Town Planning Review," of April 1917, by W. H. McLEAN, M. Inst. C. E., conveys much useful information as to existing organization of public bodies in Egypt dealing with sanitation and public improvements, as well as affording details of town-planning pursued under his advice.

The most important Body is the Legislative Assembly, which is the Egyptian Parliament. Fourteen Provincial Councils undertake the duties of administration of local affairs. These correspond with the District and Local Fund Boards of India. They are allowed to "impose temporary local taxes up to 5 per cent. of the Land Tax"—as presumably levied by the Central Government. In 1915, these Boards had at disposal £E.603,000. They were thus in a position to support "Children's Dispensaries, Maternity Schools, Ophthalmic Hospitals, the filling-up of birkas (stagnant ponds), the creation and maintenance of agricultural roads, and the establishment and management of cotton 'halakas' (official local markets). Financial assistance has been given to other public bodies for various works of public utility. The educational work of the Councils embraces the establishment and control of elementary vernacular and industrial and agricultural schools, primary schools for boys and girls and training colleges for teachers of elementary schools."

In 48 towns, containing an aggregate proportion of 1,300,000 inhabitants, Municipalities have been established. Afforded in part by local taxation and in part by Government, their financial means suffice to "construct roads, public promenades, arrange for distribution of water and electric light, and a system of drainage in a large number of towns, where formerly none of these amenities or conveniences existed."

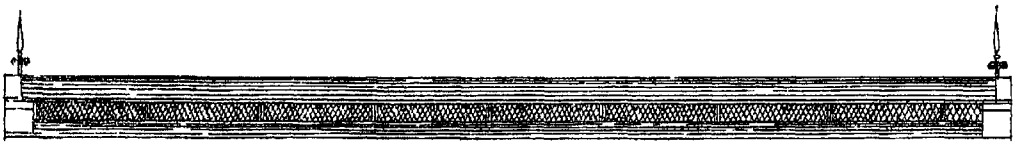
Two large towns in Egypt, namely, Alexandria and Cairo, are administered under peculiar conditions. In the former case, powers afforded the Municipality were formulated by 15 European Powers! That much advance has not been made by the Municipality is however not ascribed to inappropriate rulings, but "rather to errors of administration or inadequate supervision of the *personnel* than to inherent vices in the constitution of the municipal authority itself." As to Cairo, it possesses no Municipality, it being directly under the control of the Central Government—a condition analogous to New Delhi.

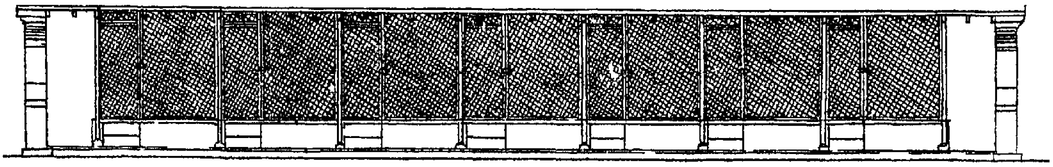
MARKETS.

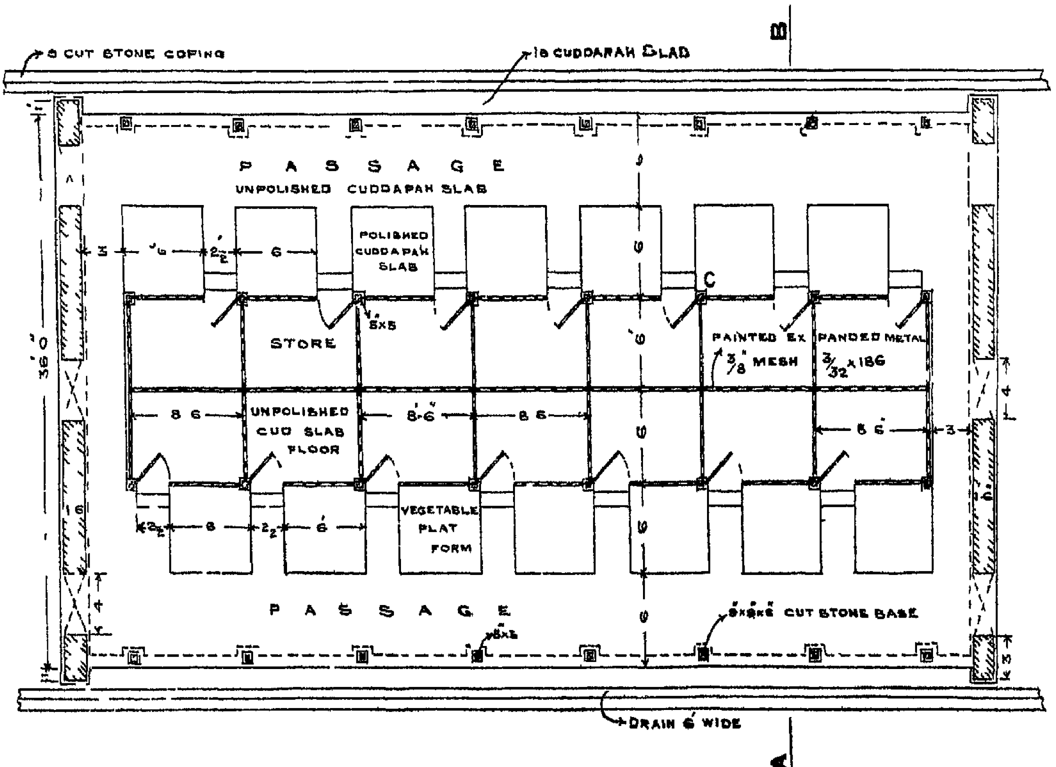
Burma.—If the tropical dealer in petty goods and food articles be allowed to be a law unto himself, he ordinarily erects an insanitary shanty in an insanitary locality. Rival dealers flock to the same vicinity, and there results an odoriferous "bazaar." Throughout Burma, the custom (presumably founded in early days of independent rule) is for, practically, all petty dealers of a town to assemble in specially designed public buildings, so-called "markets" or bazaars. Whilst few of these markets fulfil sanitary ideals, they certainly present many facilities for sanitary management by public authorities, which scattered petty shops in poor localities of towns rarely afford. But this is by no means the sole merit of the method: to Municipalities, the discreet handling of the system becomes a source of profit. The Report on the working of the Rangoon Municipality for 1916–17 [p. 9] shows the total receipts from markets amounted to Rs.2,59,779.

Madras.—Although universally adopted in Burma, the use of public markets on a less scale is well known in other tropical and sub-tropical areas. For example, as stated in the preceding Note, "halakas" (official local markets) are a feature in Municipal administration in Egypt.

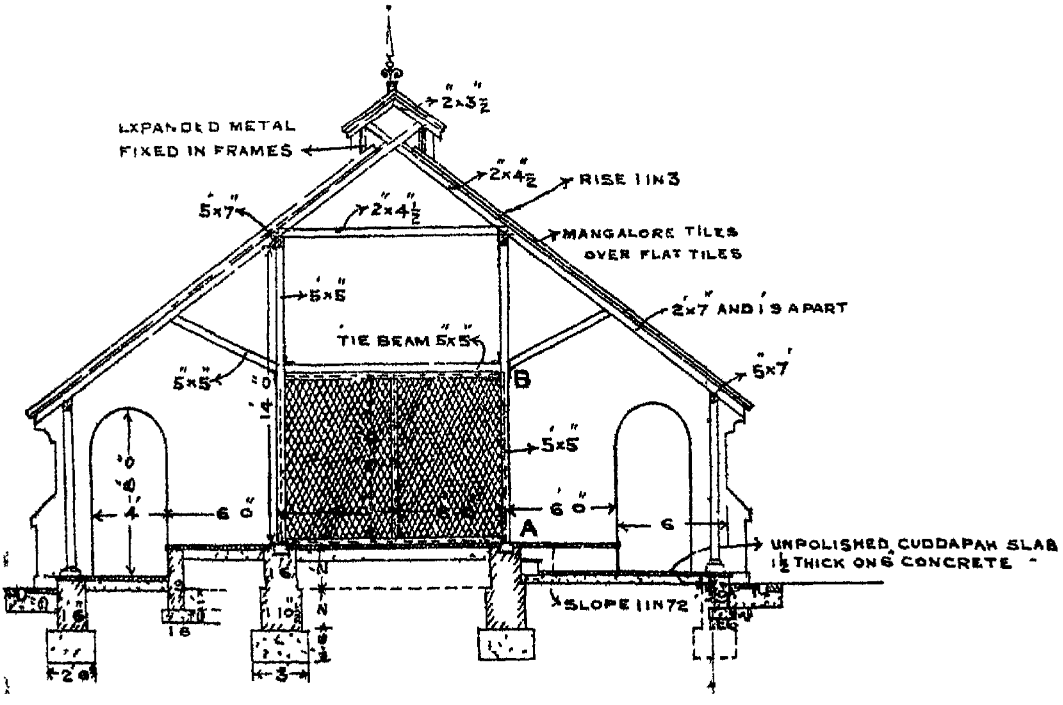
VEGETABLE BAZAARS.



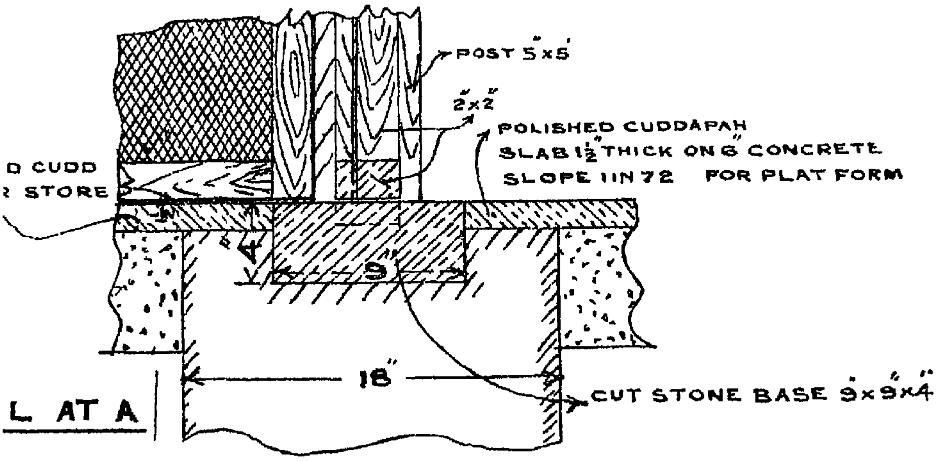


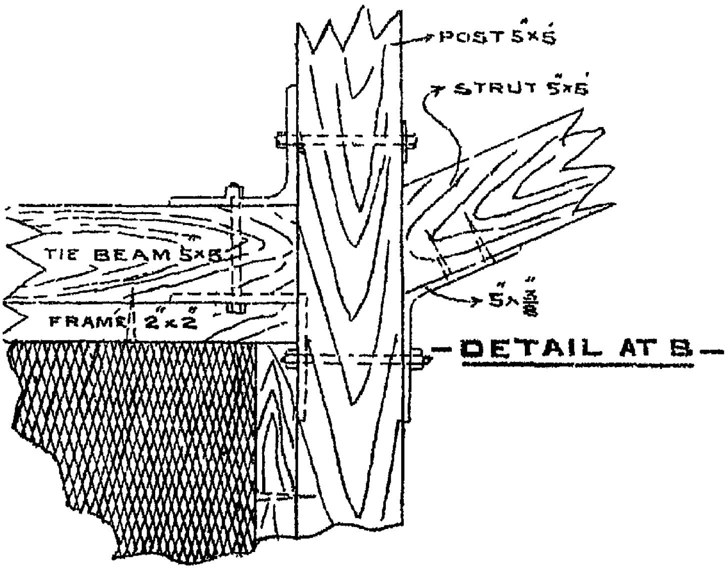


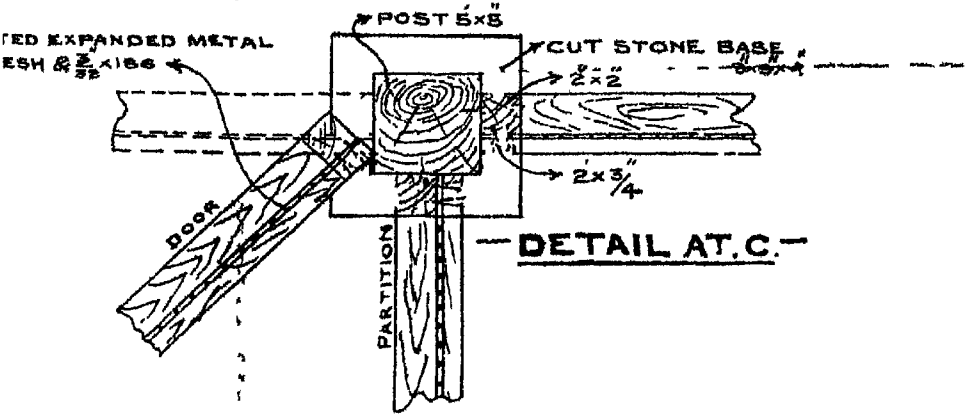
PLAN



SECTION ON A.B


POST 5"x5"
2"x2"
POLISHED CUDDAPAH
SLAB 1½" THICK ON 6" CONCRETE
SLOPE 1 IN 72 FOR PLAT FORM
D CUDD
STORE
4"
9"
18"
CUT STONE BASE 9"x9"x4"
L. AT A


POST 5"x5"
STRUT 5"x5"
TIE BEAM 5"x5"
FRAME 2"x2"
5"x3/8"
—DETAIL AT B—


POST 5"x5"
CUT STONE BASE 9"x9"x4"
TED EXPANDED METAL
ESH & 3/32 x166
2"x2"
2"x3/4"
DOOR
PARTITION
—DETAIL AT C—

In the Madras Presidency, local markets owned by the Public Bodies of the areas concerned are fairly frequent, and tend usefully to displace private owned markets. The latter are not only subject to inspection by sanitary officials but are allowed, under licences which are not too lightly charged for, to "carry on" subject to sanitary requirements specified by the local authority being met at the expense of the owners. The accompanying plan* issued to Local Bodies by the Madras Sanitary Board (Government of Madras) shows a cheap type of rat-proof building for vegetable stalls in local markets. The slabs described as "polished" and "unpolished" Cuddapah slabs are derived from deposits of laminated limestone, and present an excellent surface for maintenance of cleanliness. Glazed tiles on reinforced concrete, cement concrete with polished cement surface and, lastly, hard wood for the vegetable platform, and floors of vitrified brick, wood blocks, salt glazed tiles, etc., present possibilities, according to funds available, where similar useful slabs are not procurable.

SANITATION OF JAILS.

Col. BUCHANAN, C.I.E., Inspector General of Jails, Bengal, in his Annual Report for 1916, calls attention to the results of the life saving methods steadily pursued in Indian Jails during a series of years. The general death rate per mille of average daily strength from 1860 to 1916, he quotes as follows:—1860, 132; 1861–70, 69; 1871–80, 59; 1881–90, 49; 1906–10, 23; 1911–16 (inclusive), 21. He claims that "in no tropical country in the world can a more progressive or considerable decline in mortality be shown."

In discussing cholera, he states [p. 20]:—

> "Cholera nowadays rarely if ever obtains a footing in our Jails, yet it was once a very formidable factor in Jail mortality in Bengal as the following figures show:—In the ten years 1860–1869 the death rate among the prisoners from cholera *alone* each year averaged a rate of 16 per mille. This was rapidly reduced in the succeeding decades; from 1870–1879 it was 8·7; in years 1880–89 it was 5·5; in years 1890–99 it was 2·2; in years 1900–1909 it fell to 1·1, and since 1910 the rate has vanished to a small decimal point, viz., 0·2 per mille. Cases continue to be caught in the segregation wards in the Jails, among the new arrivals, but seldom or never does the disease spread, if ordinary precautions are taken."

ARBORICULTURE.

The hygienic and economic aspects of arboriculture is a subject which with public bodies in the tropics is liable to fluctuations, in accord with the predilections of one or two members; as a constant factor in local improvements and politics, it is liable to be forgotten. In the Punjab, the care of arboriculture is fostered by the local government requiring definite statements as to progress made from the Local Boards of the Provinces. In the Report of District Boards in the Punjab for 1916–17, the Government notes:—

> "The space devoted to arboriculture in the reports varies greatly, and in some the subject is not even mentioned. Eighteen miles of trees were planted in Gujranwala, 17 in Sialkot, and 13 in Lyallpur, but for most districts figures are not available. In Sialkot, the income from arboriculture reached the record figure of Rs.43,000, of which Rs.24,000 was clear profit, while in Gurdaspur the total income was Rs.21,000 and

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* San. No. 98 of 1913.

expenditure Rs 11,000 There seems to be no reason why other districts with an adequate rainfall should not find tree planting equally profitable

[It may be explained that much of the tree planting by Local Bodies in India is undertaken on the lines of public roads for which they may be responsible, and that ornamentation and shade alone are not sought but commercially useful woods and fruit trees are cultivated]

In the City of Madras, the Corporation Report for 1916–17 shows that the total number of avenue trees which are the property of the Corporation amounts to 15,296, and that 1,037 trees were planted during the year

SANITARY RULINGS.

QUEENSLAND.

The Commissioner of Public Health for Queensland, in his Annual Report for 1917 [p. 6] is able to give details as to prevention of venereal diseases which show that, in contrast to the United Kingdom, mere debating as to measures which should be taken has given way to action —duly supported by legislation :—

"In this State additional legislation to that laid down in the '*Health Acts*, 1900 *to* 1911,' has been provided in the '*Health Act Amendment Act of* 1917,' which has considerably increased the scope of the Department in dealing with these diseases, by providing for (1) compulsory notification throughout the State, every person affected to place himself under a medical practitioner within three days of showing evidence of the disease and to continue treatment until certified as cured (special provision has been made for free treatment, so that no excuse can be offered when a delinquent is found); (2) the establishment of clinics in the principal areas of the State; (3) public hospitals to treat free of charge any case of venereal disease; (4) Wasseimann tests are to be made without cost at the Department's Laboratory of Microbiology and Pathology for medical practitioners provided they furnish the required notification; (5) prostitutes to submit themselves for examination at certain centres. . . .

"Recommendations have been made to the Government to provide clinics at outside centres. . . .

"Prescribed forms of notification, on which the patient's name does not appear, as well as pamphlets dealing with the subject in respect to the patient and other phases appertaining thereto, are being issued. Small posters will also be provided for public urinals. Quacks and charlatans are banned under a heavy penalty from treating the disease, so it is hoped, with the assistance of the medical profession and the pharmacists, to carry out the new legislation so that every effort will be made in combating the greatest and worst of our social evils. . . .

"The cost of treating syphilis gratuitously must necessarily prove somewhat of a burden, but what is that compared with the cost of having to provide for lunacy, of which 10 per cent. is alleged to be due to syphilis, which disease also increases enormously our expense in connection with the blind. It is the bounden duty of the State to relieve the sufferer as well as to safeguard the unsuspecting future mothers of our population and their innocent and defenceless offspring."

EUGENICS.

A proposed Act is at present under discussion in the Madras Legislative Council to be entitled the "Madras Children's Act." This follows closely the lines of the English "Children's Act." In the statement of "Objects and Reasons for the Act" (*Fort St. George Gazette*, Part 4, Dec. 18, 1817) the following essential point is brought into relief :—

"*Clause* 37 empowers the Governor in Council to provide for the establishment of juvenile courts in any district. The chief value of such a court is not, as is sometimes supposed, to protect children from the atmosphere of an ordinary court. This is a secondary object, and, in this country, is probably not so important as in England. The real value lies in the facilities given to the magistrate, who is not hampered by the procedure in force in the ordinary courts, to make a thorough inquiry into the circumstances which caused the child to be brought before him. He can then decide the best procedure to adopt—whether to send him to an institution or to deal with him in some other way. The parent or guardian is compelled to attend (clause 21). The ordinary magistrate has as a rule no time to make such an inquiry."

TREATMENT OF WASTE.

SOIL AND NIGHTSOIL.

Lt.-Col. P. A. A. F. EIJKEN (Pharm. D.) and Dr. G. GRIJNS in the "Geneeskundig-Laboratorium" at Weltevreden, Dutch Indies, have recently conducted a research with the object of ascertaining the duration of persistence of intestinal microbes in soil.* They recognised that on this subject much information had been gathered in respect to temperate climates, but they anticipated that "given the immense intensity of micro-organic life in our eternal hot-house atmosphere" changes of a more rapid character might be expected in contact with soil. This they argued from their experience showing "how soon bodies of large animals are decomposed in our Malay soil, combined with the fact that very near to nightsoil pits you may find water wells very little polluted, even free from Coli." They selected, therefore, for investigation soil in the immediate neighbourhood of nightsoil pits (cess-pits) found in yards in the towns and suburbs. Within a short distance of these nightsoil pits, there were usually drinking water wells.

The authors state that, in the case of Europeans, the "water supply for the bathrooms is almost invariably a well; at a small distance off that room and near to the w.c. is the soil pit. So the well is often much too near that pit; the soil pit is ordinarily constructed with bricks not always set in mortar; sometimes concrete cylinders are used, rarely it is water tight." As to the native, they provide arrangements "extraordinarily primitive." "A hole of about a square yard surface and 1 to 2 yard depth is covered with a couple of boards or twisted bamboo wherein an opening, and a shed with bamboo walls around it. If the pit gets full it is covered up with earth, a new one is dug and the shed transferred."

It will thus be seen that the authors had ample opportunity of studying practically the problem stated by them. It was, however, complicated by the condition that in studying soil or water in the neighbourhood of a recognized pit, they might well, during soil exploration by a borer, find that another less recently-covered pit existed in close proximity. Such occurrences necessitated the elimination of data secured from their records. Again, observations during monsoon weather were so strikingly dissimilar from those found in the dry season that the authors determined to undertake a special series of experiments on the subject.

To secure, as a necessary preliminary, samples of virgin earth at different levels they used the "Fränkel ground-piercer" in various parts of Batavia. This was sterilized and inserted when cool. About 1 gramme of soil was used for the fermentation test, crushed with sterile water and put in Eykman fermentation tubes with glucose peptone saline solution, and incubated at 45° C. for 48 hours. They arrived at the conclusion that "in dry soil *B. coli* is absent at 0·5 M., while, under the influence of rain, it can penetrate to deeper layers."

Their next step was to ascertain the length of life of *B. coli* in sewage polluted water. They found that the Coli disappeared quicker than under similar circumstances in temperate climates, "that is, kept in bottles placed in a cupboard . . . the depuration proved to be surprisingly fast; out of 6 samples of well water 4 were Coli free after 9 days, the other 2 after 12." Summarizing their experiments the authors conclude on this section of their subject:—

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* *Med. Burgerlijken Geneesk. d. Nederl.-Indië.* 1917. Vol. 1.

"The recorded experiments show how our tropical heat favours the self depuration of water—faecal water included—and we need not be astonished to find in our further experiences in Indian soil the best conditions."

They then state the standard adopted by them:—"Bacteria that ferment glucose at 37° C. are found in all sorts of garden soil, even where faecal pollution is not probable. Therefore we adopt the 45° fermentation test in slightly alkaline glucose peptone salt solution as an indicator of faecal contamination."

Of their numerous experiments in the dry season it suffices to quote the following examples. At Kramat, no single fermentation at 45° C. was found, although at 3·5 and up to 5 metres there was fermentation at 37° C. At Koningsplein, of 21 wells, positive results at 45° C. were obtained only twice—once at 1·5 and once and 3·5 M.

At Tangerang road, "in wells at 1 M. distance from old w.c. pits fermentation is frequently lacking."

The authors draw the following conclusion:—

> "As to the dry monsoon, from the observations now recorded, it is clear now that the pollution of the soil of which is talked so much in Indian towns, properly speaking it does not exist. One is rather astonished by the rate of purification the Indian soil is apt to. . . . Considering all the results obtained we are convinced that continuous soil filtration will prove here very well possible, and we advised in some cases to the construction of arrangements based on this principle."

The necessity for revising the method of experiment during the rainy season arose from the authors being convinced that a source of error existed in the ground piercer becoming wet and infected in passing through the soil, and not simply from the *B. coli* passing through the upper layer of soil with the rain. They therefore trusted to water obtained by pumping by means of Norton's tube wells which, instead of giving purely local results as with the Fränkel's ground piercer, secured averages showing bacterial and chemical conditions over larger areas. In thus stating their methods, they require it to be remembered that they did not desire to ascertain "the demands of good drinking water, but we have to state for each separate court whether the quality of the ground water near a leaking pit differs from that in the rest of the court, and how far the deterioration extends." In other words, the object of the authors was not to demonstrate the safety of cess-pits being side by side with drinking water wells, but to gauge the suitability of the local soil for sewage disposal, and to devise methods founded upon information gained.

As a result of a very large number of experiments necessitating both bacterioscopic and chemical examination, the following deductions were arrived at*:—

> "If we survey the results arrived at till now, there is amongst all the courts that were examined with this method but one, where we could trace the pollution of the soil till about 5 M. from the pit. This is in the

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* *Loc. cit.* pp. 144–145.

court of a Chinese cashier at Kampoong Passer-Bahroe. And for one single pit only.

"We saw that showers even when inundating the compound are unable to pollute a good constructed Norton well. There where the groundwater is not too high and the first watertight layer is deep enough even very near to the closetpit no contamination of the groundwater took place. The biological depuration of the soil is in most cases absolutely adequate to render faecal matter harmless at a very small distance from the night soil pit.

"In compounds where the watertight layer is high, and the groundwater level is only a few decimeters under the surface, the surface infection ordinarily is the determining factor for the contamination of the groundwater. The dirt that penetrates the ground with the surfacewater reaches the groundwater so quickly as not to leave time for biological depuration. But even in these circumstances generally a contamination parting from the pit can only be demonstrated at a few meters distance. It is a matter of fact that the horizontal extension of the biological reactions must be a larger one in such grounds, and also the dangerous circle round the pit But as the groundwater in such compounds has already to be rejected for drink- or washing-purposes, this practically becomes no objection.

"Only where the groundwater reaches the surface or surmounts it by rains, a danger for infection originates by the contents of the pit entering the soil. In that case the soil should not be used for mineralising faecal matter. But then we should be already in grounds that ought to be declared uninhabitable also for other hygienic considerations.

"Seeing how in several compounds that differ much even geologically the biological actions of the soil are able to decompose big quantities of organic matter in a narrow space, and destroy intestinal bacteria too, we may expect this will hold also for other grounds than we met with here.

"We should think it imprudent however to conclude too much per analogy in a question so complicate and important and are investigations in it other grounds to be recommended. It is a constellation [*sic*] therefore, that experiments in connection with the sewerage projecting in Soerabaja could be carried out in that town, the geological formation of which differs considerably from that of Batavia."

The practical conclusion of the authors was that to secure purification of nightsoil, the most suitable course, in the locality concerned, was to present it to the soil in the liquid condition resulting from septic tank influence. For this purpose, they consider the septic tank latrines described in "Sewage Disposal in the Tropics" by Major CLEMESHA, I.M.S. (at present Sanitary Commissioner with the Government of India) as peculiarly suitable. The effluents of the tank latrine they conceived would be best disposed of by filtration as follows:—

"For the trench as well as for drains coarse riverstone or coral are to be employed to filling it till about 2 dM. below the surface; the upper part is filled with earth. It is to be recommended to place a thin layer of palm tree fibres (dooq) over the big stones, to prevent the sand from falling in. We dig the trenches about 1,5 M. deep when the watertight layer is not too high, making the bottom slightly sloping. The length of the trenches depends on the quantity of tank water we have to deal with, and the permeability of the ground."

The authors annex a plan of the latrines as suggested by them. They trust to the use of water by the users from a Norton tube well in the proximity of the latrine, and, as there is no mode of regulating the quantity employed or of air disconnection with the tank, as present in Silks septic tank latrines as improved by Major CLEMESHA, it is evident the septic tank principle, as adopted by them, is of the less elaborate nature used by the Kentucky State Board of Health [see this *Bulletin*, Vol. 9, No. 3 (Sanitation Number), Feb. 14, 1917.]

Finally, they afford evidence of the extent of soil pollution at the end of one year's use of these latrines, which is thus summarized by them [p. 153]:—

> "Near w.c. No. 1, where the next well is at 5 M. distance from the tank outlet we can not disguise [? discover] a trace of soil pollution after a year. Near w.ç. No. 2 in well 1 at 4, 5 M. distance a slight influence is sensible after a year. We find the number of bacteria a little higher (25) and fermentation in all three experiments till 1 cc. Here the coli-figure is rising.
>
> "As we did not construct an automatical control installation in account of the costs, we can not tell the number of persons who made use of the w.c.'s. However for a week we had observed the w.c. 1 and 2 from 5 a.m. till 9 p.m. and found for No. 1, 24, for No. 2, 41 visitors per day.
>
> "W.C. No. 3 has 4 seats against 2 in the other ones, and is surely the most frequented. Here the wells were 1,5 and 2,5 M. from the tank. On this small distance pollution is seen very clearly. This won't surprise us, as biological depuration has to occur not in the drains but in the soil, and some space is necessary for that purpose."

TYPE CONSERVANCY SYSTEM.

If the excreta of a population of, say, 10,000 is to be removed by means other than by some form of water-carriage system, and the locality be not unsuitable to transport by carts or tramways, it should be possible, within the limits of variation due to distance of sites of deposit, to arrive at a closely approximate calculation of the plant required and its cost, and to deduce reasonably safe proportionate calculations for smaller populations. In recognizing this principle, the Government of Bombay, in its Review of Reports on "Municipal Taxation and Expenditure" for 1915–16, [p. 10] quotes, with approval, the following remarks of the Commissioner, Northern Division:—

> "'As there did not exist in most of the municipalities satisfactory arrangements for the speedy and complete removal of all night-soil and rubbish from the vicinity of habitations and its disposal, the importance of which has been emphasised in a recent resolution of the Government of India, the Deputy Sanitary Commissioner was asked to work out a definite standard of sanitary appliances and conservancy establishment necessary for a town with a population of 10,000 souls. This has been forwarded to the Collectors in Gujarat, and they have been asked to advise the municipalities in their districts to set their towns in order by revising their arrangements in proportion to that standard.' This action of the Commissioner commends itself to the Governor in Council, and he accordingly desires to bring it to the notice of the other Commissioners."

SAWDUST FOR URINE FILTRATION.

In the *China Medical Journal* of May, 1917, Dr. Arthur COLE and Dr. E. MUIR of Kalna, India, quote facts supporting the late Dr. George Vivian POORE's testimony to the utility of sawdust as a deodorant, when employed for urine filtration. Dr. MUIR gives a description [p. 217] of a method of utilization affording excellent results:—

> "We therefore constructed a urinal for our hospital on the following lines, and are surprised and delighted at its success, which removes a terrible nuisance. A small room about six feet by six was constructed, with a corrugated iron roof. Along the west side was a trough containing sawdust and sloping towards a pipe which drains into a canister outside the house. East of the trough is a step about three feet broad sloping slightly towards the trough, and having three pairs of level bricks, cemented

over, on which the patients can place their feet when passing urine in the squatting position. This step is about fifteen inches high, so that the trough is fifteen inches deep and contains about a foot of sawdust. . . . Although this urinal is in constant use and water constantly dripping out of the pipe into the canister, we are surprised to find absolutely no smell. The water in the canister is brownish in colour from the wood, but has absolutely no smell although it stands for a couple of days. The whole building is cemented. Since it was constructed, our hospital has been a different place with regard to smells."

SANITARY WORKS.

Water-Supply of Cantonments.

Before the war Americans proved that standardization, as applied to anything from motor cars to bridges, contributed to economy and rapidity of outturn. To shelter their recently assembled large armies, during training, has necessitated the erection of semi-permanent camps, where both these conditions are essential. Instead therefore of following the British principle of allowing the authorities of localities concerned to seek from the tangle of local opinion compromises in the designing of water schemes of each camp, they from the outset laid down certain principles for observance. Where details could appropriately be defined, these were also pre-determined; so that whilst the specifications were capable of relaxation to meet varying topography and other conditions, there were fixed definitely the type plans of camps, location of mains, hydrants, distribution pipes and the service pipes for each building; and there also were prescribed certain sizes of mains for each set of conditions that could reasonably be anticipated.

The type camp has been planned to accomodate 40,000 men. In an article on " Water-supply and Specification for the National Army " (contributed to *Engineering News Record* (New York), 1918, Jan. 3, by Dabney H. Maury, Consulting Engineer for Water-Works) the advantage of this system is emphasized by the statement that whereas, in ordinary times, for a civil population of this number, the planning and completing of waterworks would take about three years, 16 Army Cantonments have been planned and completed in a little over three months. Economy was largely contributed to by about 70 per cent. of the total mains being wood stave pipes instead of cast iron; the cost of the former being " on the average 60 per cent. of that of cast iron pipes. These pipes were calculated to be capable of sustaining a pressure of not less than lbs. 60 or more than lbs. 85 per square inch. They were specified to be " of the machine wound type, so that the pipe may be shipped already made up." Under ordinary conditions of pressure the use of 12 inch mains is contemplated. The type scheme requires—

> " two lines of water mains running the length of the cantonment. If the supply be delivered into the distribution system at one end of the line of units, there should be two mains leading from the supply through the line of units and looped together at the far end. If the water enters at or near the centre of the cantonment then the two mains which run the length of the cantonment should be looped at each end.
>
> " Provided always that the initial pressures hereinbefore specified in Article 6 are at all times available, and provided further, that the spaces between the separate units are not materially greater than those shown in the typical general plan, and assuming that there will be no elevated storage available, then if the supply be delivered at one end, the cantonment will require two 12 in. mains running throughout its length, while in a cantonment with centre feed these two mains will be 10 in."

* * * * *

> " If elevated storage can be obtained to tide over the maximum drought period the size of the mains would be susceptible of reduction."

In consideration of the well known tendency of American civilians to an extravagant demand for water, the supply arranged for these camps is at the rate of 55 galls. per head. But it has been found under conditions of discipline and, therefore, the power of guarding against waste, that plenty of water is available at 30 (U.S.A.) gals. per head.

In camps where the total supply is a matter demanding care, or where full available pressure is necessary to serve the more elevated parts, the following rulings securing that heavy demands shall not not be made simultaneously upon the supply systems, should be useful in our camps in the tropics as a routine measure, irrespective of a "fire alarm":—

> "(a) All fixtures shall be shut off when not in actual use; (b) the fire drill regulations shall make it the definite duty of certain designated individuals to shut off, as soon as fire alarm is sounded, every fixture from which water may be drawn for purposes other than fire fighting, except those necessary for cooking purposes; (c) the several brigade units in each cantonment shall make use of the showers at different hours, so that the very heavy peak load resulting from the simultaneous use of all the showers may be avoided; (d) the use of water for sprinkling roadways and grounds, and for the animals, shall be so timed as not to coincide with the peaks resulting from the heavy draught for the showers."

MAKESHIFT WATERWORKS.

The world demand now is and, in the "after the war" period, will be, heavy for iron and, consequently, cast iron pipes will be costly; with the probable result of delaying the execution of public waterworks. Irrespective of this fact, the sanitarian in the tropics is liable, when advising a protected public water-supply of however simple a nature, to be confronted with the difficulty which transport of such heavy material as iron pipes implies. Must therefore a minor water-supply scheme be indefinitely postponed till transport is organized on the lines of an advanced country? Is it possible to secure methods of a makeshift type that will serve the purpose reasonably well till better times permit? For example, would it be possible to introduce, with reasonable sanitary safety, into a small town or village a water-supply under pressure without the aid of iron pipes? If this query is confined to the question of mains, the answer can be in the affirmative. In the scheme for distribution of water, the absence of small pipes and fittings would present difficulties, which however would not be insurmountable.

Wood stave pipes.—Putting aside reinforced concrete as entailing the use of iron in various forms, the employment of wood pipes suggest itself. Of trees merely hollowed out and fitted to each other end to end by bevelling, the London of olden days affords instances; wooden pipes so used are at intervals disinterred in good condition. But it is to America that illustrations of modern examples of use of wood must be looked for. For example, the extensive use of wood stave pipes is referred to in the preceding Note—"Water-supply of Cantonments."

In a paper (quoted by *Indian Engineering*, Calcutta, 1917, Dec. 1, p. 305) by Mr. PARTRIDGE, embodied in the Proceedings of the American Society of Civil Engineers, it is stated that Balsa wood (*Ochroma lagopus*) is that most approved for the purpose, but that cypress is practically as lasting; fir is also employed. The fear naturally would be that the longevity of wood stave pipes would be brief; but Mr. PARTRIDGE gives instances of pipes lasting under varying conditions up to 25 years. He also refers to instances of 13,550 ft. of

40 in. and of 26,300 ft. of 36 in. wood stave mains, working under a maximum pressure of 295 ft. and a minimum of 150 ft. The line is "underground through alkali flats, but where deep ravines are crossed it is carried exposed on trestles." These pipes were laid for San Diego and Coronada, in California, in 1900; examination in 1916 showed they were in perfect order.

These statements suffice to prove the durability of wood stave pipes for large mains where cast iron is not readily available; but a second type is also manufactured for pipes from 2 to 24 inch diameter. These are "factory made," and are capable of withstanding a pressure up to 400 ft.

> "The sections are from 8 to 24 feet long and have the necessary couplings or collars for connecting them. The staves are generally kiln-dried and are banded with galvanized wire from No. 6 to No. 00 gauge, spaced according to pressure, and fastened to the pipe with pressed steel clips or staples. Each section is dipped in asphalt and rolled in saw-dust, the asphalt effectually covering the wire and staves, and the adhering saw-dust permitting the pipe to be handled readily. The sections of light-pressure pipes are joined with inserted or slip-joint connections, being sometimes reinforced with a steel band equipped with a shoe for cinching tight."

Whilst the longevity of wood staves is of the good duration noted above, both in air (supported on trestles) and below soil, it is evident from a statement of experience made by *Engineering News Record* (New York), Dec. 27, 1917, p. 1204, that care is requisite as to nature and depth of the trench in which wood stave pipes of large diameter are laid. The limit is thus defined:

> "Where the sides of redwood pipe can be held firmly in place so that the horizontal diameter cannot increase, then 1½ in. redwood staves are capable of safely supporting under the most severe assumed condition of loading a mud fill slightly more than 2 ft. in depth over the top of the pipe. If the staves are 2½ in. in thickness this depth of fill can be safely increased to about 6 feet."

The present day wood pipes are built of staves air dried. For Balsa wood no internal coating is necessary, but firwood pipe staves are well preserved by a coating of tar and asphaltum. Steel bands are used and so spaced "that they will have a safety of form against breaking due to tension caused by the water pressure."

Earthern pipes.—Unglazed pipes of the character of agricultural tiles would certainly present little prospect of conducting water under pressure. This however was not the opinion of the Engineers who under Malik Umber (Regent and Minister during the minority of the Emperor Shah Jehan) in the 16th century, formed the remarkable water-works at Aurungabad in the Hyderabad Territory (Deccan). They used unglazed pipes for their mains, but took the precaution of surrounding them *in situ* with lime concrete. Practically, the earthern pipes merely formed the lining of concrete pipes.* Although here and there, in the lapse of centuries, the pipes have yielded, the bulk to this day perform their duty.

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*It is possible that the excellence of the concrete was contributed to by the use of "jagghery" water—that is, a solution of crude cane sugar. Its use may perhaps be futile; but old masons in the Deccan have, to the writer's knowledge, faith in this combination. The subject of what, if any, new combination or modification of conditions results from the mixture is worth pursuing, when "sugar coupons" are no longer necessary.

The object of the writer in referring to these pipes is to suggest that in areas in the tropics where a village potter can form and kiln earthern pipes, and where there is fuel (say, charcoal made on the spot) wherewith to make lime from chalk, limestone, shells or coral, and, in the absence of suitable stone, for the burning of bricks, the sanitarian can undertake makeshift waterworks of real utility. Typically, a Medical Officer with jail labour at disposal should, in localities where no Engineer is available (and still less iron pipes), be capable of supervising the whole of the necessary details.

But having obtained pipes, there would still remain the difficulty, if water is to be introduced into an inhabited area correctly protected from contamination, of obtaining service pipes of small diameter. Here, if short lengths of iron pipes be provided, the total demand need be but of a limited nature. In their absence, it would still be possible to fall back upon the small wood wire-bound pipes above referred to. Failing these, closed masonry cisterns above and below ground level of various designs provided with taps will suggest themselves as aiding this end, according to the topography of the site.

Malik Umber's Engineers made cisterns, so called "Khazanas" (treasuries), which were central distributing points for supply of consumers as in figs. 1(a) and 1(b). The distribution was conducted by "nuldars" (pipe-men) who held hereditary office. They closed the orifices of outlet pipes (shown in the plan of "Khazanas") or placed bricks at angles which long practice had proved would permit the passage to a consumer of a definite amount in a definite time.

So far then as to pipes; but the question of these earthern pipes (notwithstanding their concrete exterior) resisting pressure remains. This could be met by employing the simple yet ingenious system of "break-pressure columns" adopted on the Malik Umber Works above referred to. The principle under which these act will be self-evident from the annexed plan, fig. 2.* By repeated use of these on a pipe line on a descending gradient, the pressure can be reduced at will. It is understood similar columns are found on old waterworks near Constantinople.

COST OF WATER.

From the note under Sanitary Works in this number relating to cost of pumping for water supplies of towns, there are afforded data for contrasting the economy of the various mechanical methods employed. The homily to the taxpayer as to waste may be aided by quoting the actual cost thus exhibited, but conviction should be more readily thrust home by the reminder that it is not only in introducing water to a town that cost is incurred but also in getting it safely disposed of in the form of sewage. Mr. Maloney, I.C.S., the

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* A further instance of knowledge of engineering hydraulics in the Malik Umber Works is exhibited in the use of the syphon principle in conveying the water across the river Uisool as shown in fig. 3. This crossing of the river to reach the City of Aurungabad emphasizes the fact that the intention of the infiltration gallery was to intercept the subsoil water *en route* to its natural outlet, as exhibited by the trend of the country. In the old local palaces, fountains and cascades were employed from the supply.

FIG 1 (a)

Section (A—B) through "Khazana," or storage cistern regulating distribution in defined areas

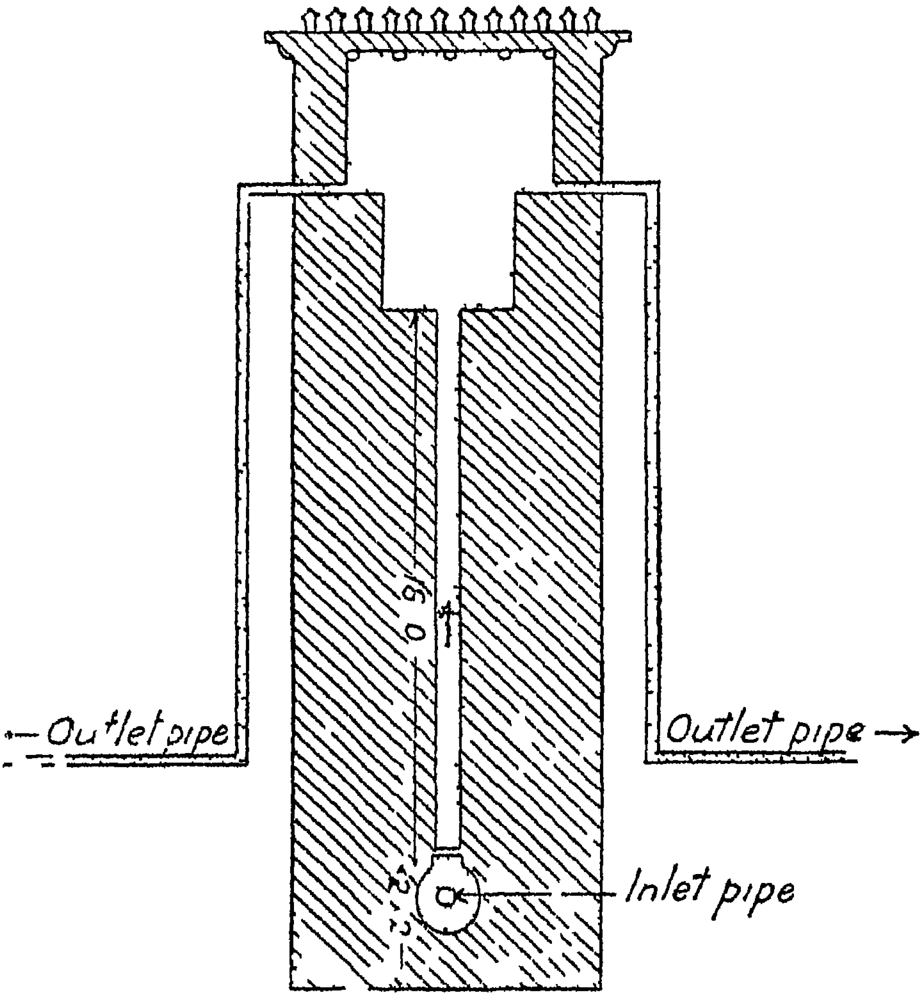


FIG. 1 (b)

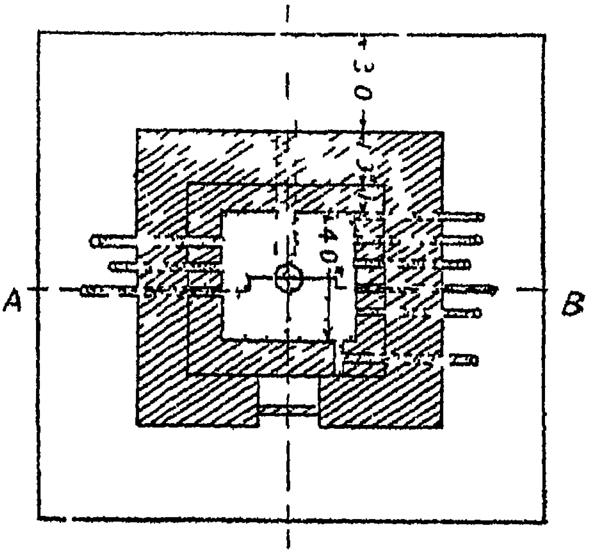


Fig 2
Section of Break Pressure column Scale 9 ft = 1 in

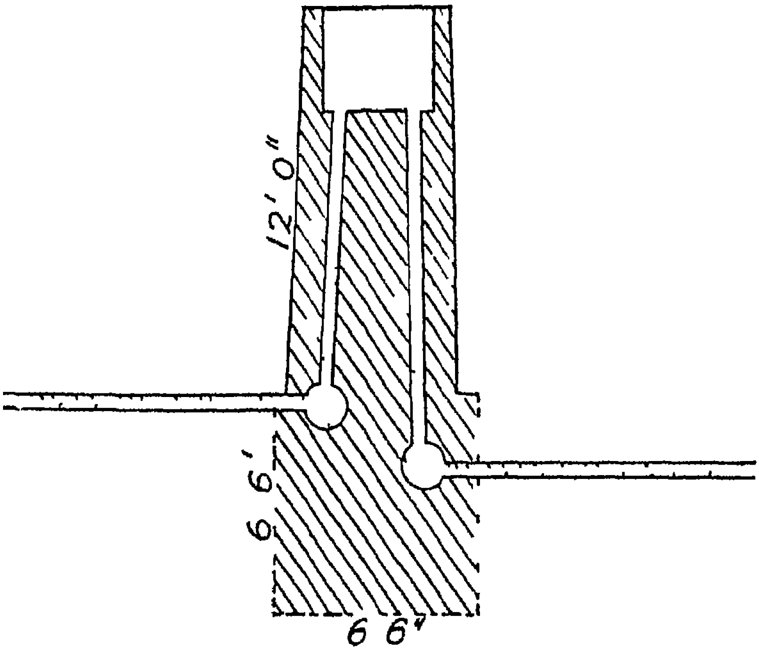
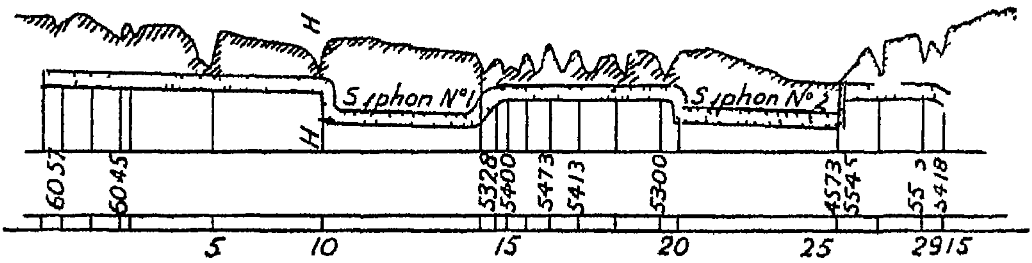
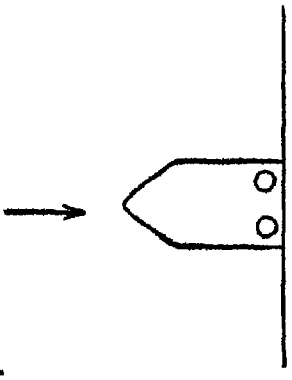


Fig 3
Longitudinal Section of a portion of Main Tunnel showing both Syphon



Scale {Hor 800' / Ver 80'} To = 1"

Section of Tunnel at HH showing face of Syphons Scale 10'-1'



President of the Corporation of the City of Madras, thus calls attention to the subject* :—

"The financial stringency has resulted in a close examination of the cost of supplying water to the City and the economies that may be effected. These were fully dealt with by the Special Engineer in his report, dated 22nd July 1916.

"He concludes that the water costs are as follows:—

	Cost in annas per 1,000 gallons.
Paid to Government for supply at Red Hills ..	0·01
Conveying from Red Hills to Kilpauk	0·01
Filtering at Kilpauk	0·05
Pumping at Kilpauk	0·36
Distribution through city	0·25
Total for maintenance only	0·68
Add for depreciation and interest on capital ..	1·48
Total cost per 1,000 gallons, annas ..	2·16

"This is the cost of the water pumped into the mains, but as at the present time two-fifths of the water is wasted or used for unremunerative purposes, the cost charged against water paid for has to be increased in proportion and when thus corrected it becomes 3·6as. per 1,000 gallons.

"But the water costs the Corporation more than this, for it forms sewage which costs as.3·54 per 1,000 gallons to remove and deal with. The total cost of providing 1,000 gallons of water and dealing with it as sewage is as.5·7 per 1,000 gallons. From these data a simple calculation shows that every gallon of water wasted per head per day in the course of a year costs the Corporation Rs.65,000 to provide as water and deal with as sewage."

THE COST OF PUMPING.

Failing the possibility of securing a public water supply by means of a gravitation system, authorities in the tropics are apt to reconcile themselves to the absence of any scheme which entails pumping, on the vague ground that the cost would prove "prohibitive." Doubtless this is frequently the case; but no such conclusions should be accepted without careful estimates being prepared. Hence data gathered under observed conditions in the tropics are of value. In the Madras Presidency, at water-works where pumping is employed, records are maintained which supply statements of the type of machinery used, fuel consumed, amount of water pumped, height to which lifted, etc. These records are systematically scrutinized as to their reliability by the Sanitary Engineer to the Government, and his staff during periodical inspections. The results ascertained during 1916, recorded in the following table † (as given in the Twenty-Seventh Annual Report of the Sanitary Engineer, p. 54), are likely to be of utility elsewhere, if local cost in any particular locality be applied to the amount of fuel stated :—

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* Administration Report of the Corporation of Madras for 1916–17. 1917. Madras: Printed by Thompson & Co. pp. 28–29.

† Abbreviated by omission of names of stations, total quantity pumped and totals of fuel used, during the year.

Statement of the Results of Pumping at Certain Water-Works in the Madras Presidency possessing Pumping Plant

Stations.	Average lift.	Description of fuel.	Pounds of fuel consumed per 1,000 gallons.	Cost per million gallons raised 1 foot high	Pounds of fuel consumed per pump horse power.	Remarks.
1	3	5	6	7	8	9
A	ft. 70·00	Liquid fuel	lb. 0·34	Rs. a. p. 0 5 3	lb. 0·97	Diesel oil-engines with belt driven, geared Worthington Triplex deep well pumps.
B	70·75	Coal	7·05	1 14 6	19·74	Hathorn, Davey Horizontal compound surface condensing engines and pumps
C	49·32 **48·91**	Do.	3·34 **3·60**	0 13 10 **0 14 6**	13·16 **14·34**	Horizontal direct-acting Worthington compound surface condensing.
D	45·68 **43·93**	Do.	2·15 **3·13**	0 11 10 **0 13 1**	9 33 **14·73**	Horizontal direct-acting Worthington compound engines and pumps.
E	53·55	Kerosine oil	1·21	1 1 10	2·51	Hornsby Akroyd oil-engines with belt driven geared Worthington Triplex pumps
F	28 00	Do.	0·85	9 1 6	6 22	Black stone oil-engine and belt driven centrifugal pump.

G	45·50 **45·50**	Wood and residue and kerosine oils	16·24 **16·25**	2 7 5 **1 12 11**	70·83 **57·61**	Vertical compound steam-engines with direct driven twin series Gwynnes centrifugal pumps and Diesel and Hornsby oil-engines with belt driven "Rees Roturbo" centrifugal pumps.
H	46·99 **42·36**	Coal	2·18 **2·20**	0 11 10 **0 13 5**	9·20 **10·29**	Horizontal Worthington direct-acting triplex expansion engines and pumps.
I	148·13	Do.	4·82	0 12 1	6·44	Vertical Worthington direct-acting triplex expansion engines and pumps.
J	66·34	Kerosine oil	0·33	0 7 11	0 99	Hornsby oil-engines with belt driven Worthington Triplex geared deep well pumps.
K	29·95	Do.	0·44	2 10 2	2·90	Hornsby oil-engines with belt driven Worthington Triplex geared pumps.
L	83·95 **81·76**	Coal	2·71 **2·36**	0 9 2 **0 10 10**	6·40 **8·34**	Vertical Worthington direct-acting Triplex expansion engines and pumps.
M	100·88 **98·74**	Do.	3·82 **2·93**	0 9 3 **0 10 0**	7·53 **8·32**	Do. Do.
N	61·73 **64·54**	Do.	4·99 **5·10**	1 5 8 **1 6 3**	15·55 **15·55**	Horizontal Worthington direct-acting Triplex expansion engines and pumps.
O	207·59	Do.	7·81	0 7 9	7·45	Vertical Worthington direct-acting Triplex expansion engines and pumps.

[*Note.*—Figures in *thick type* are averages for eleven years.]

PREVENTION OF WATER-WASTE.

The Sanitary Engineer to the Government of Madras (Superintending Engineer, W. HUTTON, D.P.W.) gives in his Annual Report for 1916 [p. 50] the following opinion as to the importance of using meters for controlling waste of domestic water supplies :—

> "Owing to numerous complaints from the general public of deficiency of supply at public fountains, the policy of metering house connections was brought forward a few years ago and the results, so far as they have gone, have amply justified the introduction of this policy. Formerly it was almost impossible to detect waste of water, the only evidence being the admitted deficiency at public fountains while the records of the head-works showed that a sufficient quantity of water had been sent to the town.
>
> "Now about twenty-five per cent of house connections have been metered and this has resulted in a more equable supply to the other houses and to public taps.
>
> "The policy of metering these connections is not a popular one, but it is essential if any systematized and equable supply is desired. The free allowance of water granted under the by-laws of a municipality is ample for ordinary requirements and the extra charge for excess water used for a domestic supply, twelve annas per 1,000 gallons, is low and should not affect the bona fide use of water from a municipal water-works. It is essential that the policy of the introduction of meters should be persisted in, and the rate of introduction of meters accelerated. The cost of the meters, it has been found, is usually recouped to the municipal council in a few months, while the reduction of quantity of water used in a house is very evident. This reduction, it should be remembered, is not, as some say, usually interested parties, due to the stinting of the supply but practically represents the saving gained by the closing of house taps by consumers, when the required quantity of water has been drawn off."

WATER PURIFICATION PLANT.

Storage and methods of purification in connection with public water supply systems in the tropics present many unsolved problems. Systematic investigation for some time past has been conducted on these subjects, under the auspices of a Committee appointed by the Madras Government. The members are—the Surgeon-General with the Government of Madras (Surgeon General BANNERMAN, C.S.I.), the Sanitary Commissioner for Madras (Lt.-Col. JUSTICE), the Director of the King Institute (Dr. Maitland GIBSON) and the Sanitary Engineer to the Madras Government (Superintending Engineer W. HUTTON). In his Report for 1916 the last-named Officer makes the following remarks on the subject* :—

> "The works are unique in that they are believed to be the only ones of their kind in India, and the object of them, the obtaining of knowledge by actual research work under tropical conditions, was advanced during the year in a number of ways. At present the results of protecting a sand filter from the sun by a light roof has proved most interesting and valuable, and the effect of the sun on storage in a tank for some days will, it is believed, show that the storage of water in tanks for a certain number of days in the hot weather results in its sterilization under the effects of an Indian sun.
>
> "The experimental works are maintained in a highly efficient condition, as is necessary with such investigation works, and they form an interesting addition to the King Institute of Preventive Medicine.
>
> "It is proposed to recommend to Government that the operations should be continued for another year."

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* Madras. The Twenty-Seventh Annual Report of the Sanitary Engineer. 1916. 1917. Madras: Printed by the Superintendent, Government Press. p. 52.

WATER PURIFICATION.

In this *Bulletin* (Sanitation Number) Vol. 10, No. 1, July 15, 1917, p. 34, note was taken of the important work in connection with the laboratory control of water purification plant on the Panama Canal. A further Report for 1916–17, in continuation of the results secured, by Mr. G. C. BUNKER,* the official Physiologist, and his skilled staff has now been issued. The details afforded are of an elaborate and exhaustive nature, so that, irrespective of special points which have been now elucidated, there remains a mass of data to which mere repetition in course of time may add weight and which may prove of utility in dealing with various still unsolved water purification problems. The work fulfilled covers an experimental study of adaptability to requirements of apparatus and filter media in water purification plant, as well as identification of low organisms and the chemical and bacteriological conditions encountered. In the interests of space, it is necessary to confine attention to data concerned with present day practical methods.

Free carbonic acid as a money waste factor.—The filters employed are of the rapid sand type otherwise known as "mechanical filters" or "American filters," which terms are used in contrast with the "slow sand" or "British filter." This type necessitates the formation of an artificial film with aluminium hydrate and an acceleration of speed under pressure through the filter, much beyond that attainable or desirable by gravitation through slow sand filters. Without discussing the comparative merits of the two systems in arresting water borne microbes, it may be said that if the filter material on the rapid system is to perform its function efficiently washings must be frequent, and, this being so, in localities where either the total available quantity of water dictates economy or the necessity for lifting it involves expense, it is not a method that can be adopted without careful weighing of the pros and cons. Any arrangement by which the cost of labour and expenditure of water can be decreased must therefore be of value.

In the *Bulletin* above referred to the influence of aeration upon carbon dioxide, as found by Mr. Bunker, was quoted. He now shows that the process is of value in removal "by aeration of free carbonic acid liberated by the formation of aluminium hydrate, thereby reducing the amount going on the filters and increasing the length of the filter runs." If the free carbonic acid is thus formed and spraying could diminish it, a natural deduction was that the alum should be added to water before it passed through the spraying nozzle. Acting on this opinion Mr. Bunker directed that the alum should be applied at the inlet end of the aeration basin, instead of the outlet as hitherto practised.

"The results effected by this change in treatment have been, as follows: (1) Reduction of free carbonic acid in the settled water applied to the filters; (2) increase in length of filter runs; (3) decrease in the number of filters washed and the percentage of wash water; (4) reduction in running hours of two air compressors."

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*MS. Report on Operation of Purification Plants, Inspection of Reservoirs, and the Laboratory Control of the Water Supply in the Canal Zone. Fiscal year ended June 30, 1917. Prepared by GEO. C. BUNKER, Physiologist to the Panama Canal.

Mr. Bunker furnishes a table showing that "as compared with the previous fiscal year, there was a decrease of 729 in the number of washings with a resultant saving of 39,639,000 gallons of wash water, a 44·5 per cent reduction."

Jar experiments by Mr. H. F. Schmidt gave the following results as to free carbonic acid.

Grains per gallon of alum.	P.P.M. of free carbonic acid liberated		Variation.
	Jar experiments.	Theoretical.	
0·5	3·0	3·4	—0·4
1·0	6·0	6·8	—0·8
1·5	8·3	10·2	—1·9
2·0	11·5	13·6	—2·1
2·5	14·8	17·0	—2·2
3·0	18·1	20·4	—2·3

Alum and lime treatment.—But obviously aeration was not the only method open for getting rid of excess of carbonic acid:—

"In order to secure a final water with a colour of about seven parts and an iron content of about 0·15 part, it has been found that the water must be so treated with alum in the first sections of the settling basins as to enter the second sections with an iron content of that desired in the filtered water and a colour of two or three parts less, for the lime increases the colour of the settled water through its action on the flock.

* * * * *

"It was found feasible to neutralize all of the free carbonic acid in the settled water and to add 5 to 10 parts of normal carbonate alkalinity ($CaCO_3$) and at the same time to reduce the colour of the filtered water to 7 to 10 parts and the iron to less than 0·3 part. This method of treatment possesses the following advantages:—

"1. The lengths of the filter runs are increased to an average of 65 hours, and the per cent. of wash water reduced.

"2. The cost of operation is reduced.

"3. The rate of the corrosive action of the water on galvanized iron and lead pipes is slowed up.

"4. The multiplication of bacteria in the second section of the settling basins is limited.

"5. A reduction in the bacteria in the filtered water results during the period of storage between the time of pumpage of the water from the plant and its withdrawal from the distribution system by consumers.

"The disadvantages are:—

"1. A faint flat taste results from the removal of all the free carbonic acid, which is not noticed by the average consumer.

"2. An excess of normal carbonates leads to the formation of a soft cream coloured deposit in galvanized iron pipes of which the rapidity of the accumulation increases as the rate of circulation through the pipes decreases.

"3. The hardness of the water is increased about 10 parts, making a total hardness of about 26 parts.

* * * * *

"On account of the low colony counts in the sludge from the 2nd sections of the basins, presumably due to the bactericidal action of the mixture of lime, it was thought that the multiplication of bacteria in the settled water was occurring during the passage through the first sections of the basins and that, after the addition of the lime at the baffles, no further multiplication would occur in the second sections. In order to obtain some information about this point, samples were collected from the settled water in the first sections, prior to the addition of the lime, and from the final effluents of the second sections as they entered the filter box.

"Of the 23 samples examined, all except three of the lime treated settled water showed a decrease in the numbers of colonies of bacteria as compared with the corresponding samples of the settled water prior to the addition of lime. While the data is insufficient for preparing a definite statement as to the degree of bactericidal action of the lime in the second sections of the basins, the conclusion may be safely drawn that the multiplication of bacteria in these sections is prevented as long as normal carbonates are present. The decreases will vary, of course, according to the periods of subsidence in the basins."

Treatment by chlorine. An experiment was made of using liquid chlorine in the water after filtration and before filtration, respectively. In the former case, it was found that—

"the maximum amount which could be applied to the water, without imparting a chlorine taste to the water in the distribution system, was 1·75 lbs. per million gallons, or 0·21 parts per million of available chlorine. . . . While a satisfactory reduction of the bacteria in the filter effluents resulted, namely, from a monthly mean of 304 to 4 colonies per cc. in the sterilized water samples collected from the discharge of the pump, a multiplication occurred in the distribution system, so that the average of 90 samples collected in Cristobal and Colon was 100 per cc."

In the treatment by chlorine prior to filtration, at first 0·36 parts per million of available chlorine was employed, but as this imparted a taste to the filtered water it was reduced to 1·9 pounds per million gallons.

In 28 samples of water giving 365 colonies per cc. there was a reduction prior to passage on the filter to 25 per cc., but, as the water went through the filters, 30 samples gave 1,411 per cc., and of these 70 per cent. gave colonies above 1,000 per cc. In the distribution system, a reduction occurred of 90 per cent. giving a mean of 903 per cc.

On these results Mr. Bunker remarks :—

"As long as the species of bacteria, which multiply in the filters, are present even in small numbers in the wash water, they will be constantly returned to the filters and act as 'starters.' Therefore as long as sufficient chlorine cannot be added to the water, on account of the production of a taste or odor, to insure a permanent sterilizing action, a multiplication of bacteria will occur in the wash water tank. To eliminate the bacteria which multiply in the filters at this plant they must be washed with a wash water which is sterile or nearly so."

WATER-SUPPLY AS AN ANTI-MALARIA MEASURE.

A public water-supply system which can dispense with any form of impounding reservoir or filter, is protected throughout the course of its catchment, needs but little use of pipes beyond its distribution system, and dispenses with pumping, should be ideal both for sanitary and financial reasons. These virtues are more likely to be found combined in a system which looks to an infiltration gallery as its source than any other, as presenting to the sanitarian in the tropics, with solely indigenous skill at his disposal, the best opportunity of making a successful makeshift water-supply for a village; or still better a combined anti-malaria and water-works scheme. The simplicity and effectiveness of the methods involved in the use of infiltration galleries naturally appealed both to engineers and agriculturists of bygone days. They are found as the sources of ancient water-works in Spain, Turkey and India. In Afghanistan and Italy, they occupy as irrigation-works an important place in cultivation. Probably the Malik Umber water-works of Aurungabad, referred to in the preceding Notes as to makeshift pipes, affords one of the best examples. Here, the requirements of an area of ground sufficient as to catchment in relation to the rainfall, capable of percolation and possessed of a trend towards the natural outlet for subsoil flow are obvious. Malik Umber's Engineers taking advantage of these conditions ran the gathering gallery *between* the catchment area and the river Ursool so as to intercept the subsoil water—thus avoiding the mistake at times made, in the present day, of trusting to percolation *from* the river.

Mr. W. Marrett, late Chief Engineer, Nizam's D.P.W., in an Official Report (1895) forwarding a water-works scheme for the Cantonment of Aurungabad incidentally refers to these ancient works (at that time supplying the City) as follows :—

> "The work consists of a subterranean infiltration gallery 9,100 ft. in length, very irregular in shape and dimensions, having a width of 2 to 3 ft. and a height of from 6 to 10 ft. The floor is 12 ft. below the bed level of the Ursool river, which flows by its side. The roof is a brick arch supported on the porous trappean formation, which forms the sides of the gallery. Shafts called 'Roshundans' [light holders] communicate with the surface at intervals of 200 to 300 ft. The catchment area of the water bearing stratum is 12 square miles. The gallery intercepts[*] the spring flowing subterraneously to the river, the natural outlet of the valley."

The similarity of the work as described by Mr. Marrett with that of the same class found in Italy, will be apparent by reference to Figs. 4 and 5 from the paper on "Italian Irrigation," by Luigi Luiggi (Professor of Hydraulic Engineering, Royal University of Rome) read at the Meeting of the International Engineering Congress of 1915, at San Francisco. That authority states that "some parts of the Roman Campagna, and also around Naples, are literally honeycombed with a network of narrow tunnels (a great many of Etruscan and Roman origin are still in working order) that collect and bring to the surface at a lower level the rain water that percolates through the fissured volcanic formation of these regions." In referring to "the large volumes of water flowing underground from the lakes or the mountains to the river Po," he states that, "the water can easily be tapped by ordinary wells of about 20 or 30 feet diameter and conveyed by a deep cutting to the surface of the fields at a lower level."

Prof. Luiggi's reference to the network of tunnels in the Roman Campagna should recall the contention of Tomasi Crudelli that these formed, in their effect upon the subsoil water, the real protection from malaria of the areas near Rome during the prosperity of the Empire, until their disrepair favoured malaria production.

The holding in mind of the principles involved in these old works may well enable a sanitarian to advise an interception trench, gallery,

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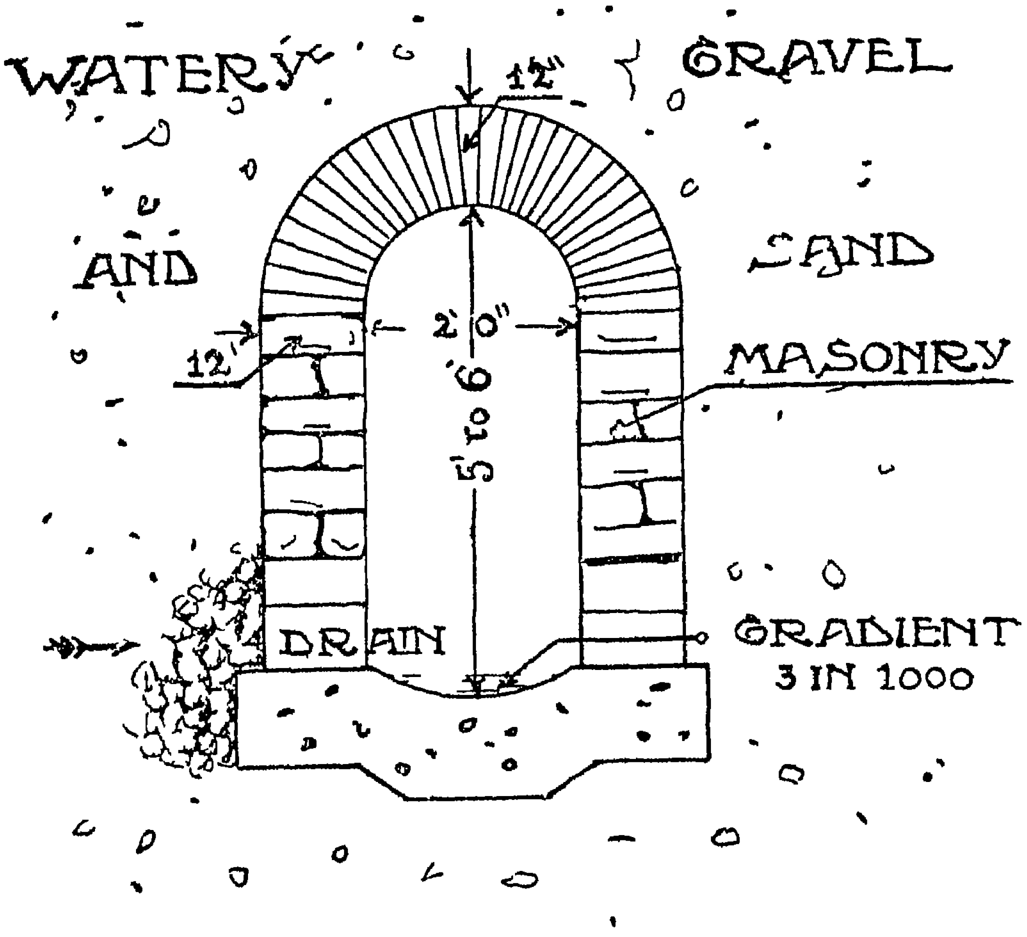
[*] When fairly cleared of silt, Mr. Marrett reported the gallery as yielding 1,705,536 gals. per 24 hrs.; or 180 gals. per foot run of gallery. Fanning quotes 150 to 200 U.S. gallons per square foot of bottom area, as amounts that may be reasonably expected from suitably situated galleries.

Fig 4



INFILTRATION TUNNEL

Fig 5.

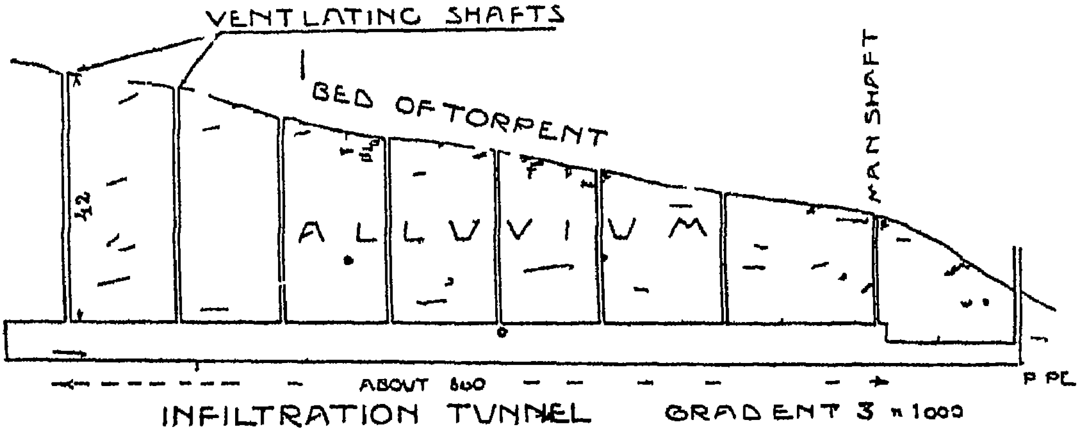


Fig 1 Infiltration Tunnel at Mazzara Sicily Discharge 23 Gallons per Second

subsoil drain, relief well, or series of relief wells which, whilst lowering subsoil water as an anti-malaria measure on plains at the foot of hills, may also serve for the collection of drinking water for inhabited areas at lower points. Nor in attempting the double function indicated in the first part of this Note, need it be held necessary that methods depending upon gravitation for points of discharge be solely trusted to, in flat areas. The lowering of the subsoil water table in a malarious tract can also be secured by pumping for the water-supply of distant localities. [See also this *Bulletin* (Sanitation Number), Vol. 8, No.5, Oct. 15, 1916, pp. 313-325.]

EXPERIMENTAL ANTI-MALARIAL MEASURES.

In a Note under malaria in the preceding pages, it has been shown that the Bengal Presidency is happily passing from prolonged debate as to what anti-malaria measures should be adopted to action. Certainly, an area in which the deaths from "fevers" during 1916 were nearly a quarter million less than in 1915, but still amounted to 909,880, is to be congratulated on the prospect. The Government of Bengal in its Resolution on the Reports of the Sanitary Commissioner, Sanitary Board, and Sanitary Engineer for Bengal, (Municipal Department), 1916-17, states that a beginning was made of three out of four schemes designed by Dr. **BENTLEY** (Sanitary Commissioner for the Government of Bengal) "as experiments on anti-malarial operations."

[The problem involved in all anti-malaria efforts is the timely prevention of moisture surplus to plant growth from forming collections of water suitable for the breeding of Anophelines in the proximity of dwellings, within the flight-distance of the malaria-bearing mosquito of the locality. The only answer to that problem must always be that in no one place can one engineering method, or anti-malarial palliative measure, be adopted to the exclusion of others if success is courted. Hence it may be concluded that the Sanitary Commissioner considers the localities suggested by him as the object of experiments are suitable for the more extensive employment of a particular method than elsewhere. In so far, the efforts will be of value; but if conducted in the spirit and strictly within the limit of experiments on single methods, their sanitary and financial value must be minimized.]

The following is the description of these anti-malaria efforts as afforded in the Government Resolution*:—

> "Two of the experiments are to be made in the deltaic tracts, viz., one in a rural area in the Burdwan district and the other in the town of Jangipur in the Murshidabad district. The Sanitary Commissioner describes these schemes as follows:—
>
> 'In the Burdwan and Jangipur schemes the idea is to take in the silt-laden waters of the Damodar and Bhagirathi rivers, respectively, during the floods so as to reduce what is called areas of mosquito-breeding edges by converting a large number of small pools into a big sheet of water, and at the same time to enrich the soil by allowing the silt to deposit on agricultural land. By constructing a series of regulators and sluices, it is arranged to control the flood water, so as to allow only a sufficient

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* Tenth Triennial Report on Vaccination in Bengal for the years 1914-15, 1915-16 and 1916-17. By Dr. C. A. **BENTLEY** [M.B., D.P.H., D.T.M. & H.]. Sanitary Commissioner for Bengal. 1917. Calcutta: The Bengal Secretariat Book Depot. [Price Indian, 9 annas; English, 10*d*.]. pp 2-3

quantity that may benefit the crops and not drown them ; and at the same time only the silt and not the sand may be deposited on agricultural land—a special method technically known as 'Bonificazione.' By this method it is also contrived to flush out old insanitary tanks and ditches, and in course of time to silt them up.'

"The basis of the third experiment is a system of subsoil drainage, which has been successful in Panama and the Federated Malay States, but has not been attempted in Bengal in connection with the anti-malarial operations. This experiment is to be made at the Meenglass tea estate in the submontane region in the district of Jalpaiguri. A fourth will be carried out on a colliery situated at Singaram in the Burdwan district, in the rolling upland country which covers a large area in West Bengal. In these latter tracts the chief carriers of malaria are believed to be stream-breeding mosquitoes which differ in their habits from the common carriers of malaria met with in deltaic areas. The two schemes have been specially drawn up with the object of ascertaining the best method of dealing with these mosquitoes and determining the minimum area round a village that must be controlled in order to bring about a reduction of malaria.

"At Meenglass the hill streams, in which a dangerous species of anopheline mosquito breeds, will be put underground, the water being carried off in subsoil drains when the flow becomes sluggish, while the storm flow is allowed to pass over them in the usual stream channels. The Singaram scheme consists of two parts, viz., (1) a thorough surface drainage of the area to be experimented on, and (2) the periodical flushing of a small river in which malaria-carrying mosquitoes of a vicious character breed. The object of the first part is to drain away pools and depressions in which malaria-carrying mosquitoes breed ; that of the second is to substitute a series of flushes in the river instead of a sluggish flow, for it has been ascertained that mosquitoes breed along its edge when the flow is gentle, but when the river is in flood their eggs and larvae are carried away. It is therefore proposed to construct a weir with sluices so arranged that, when the sluices are closed a head of water will be accumulated behind the weir, and this will be periodically discharged so as to flush the bed of the rivulet. It is hoped that three of the schemes will be completed during the current year ; and the Governor in Council looks forward to the results of the experiments with much interest."

REINFORCED CONCRETE ROOFS.

"Concrete" (London) according to the *Indian and Eastern Engineer* of Jan. 1918, p. 9, contains an article by Mr. A. B. PRICE, A.M.I.C.E., wherein, as a result of prolonged experience in India, he has no hesitation in advising the use of reinforced concrete roofs in that country. He insists that, provided ordinary care is forthcoming, success must result. He urges that the proportions of the cement (slow setting to be preferred), sand, and stone mixture cannot be secured by following a "rule-of-thumb" formula. He prefers to "define the proportions as 4 to 1, 3 to 1, and so on, leaving the exact proportion of stone and sand to be settled by practical trial." Similarly, by experiment the largest size of stone permissible may be ascertained : "for, in some cases crushed stone of 2 in. or even more may be used, provided the rest of the smaller crushed stuff goes along with this, only eliminating the actual dust for strength, and retaining the usually small quantity of dust in case of a watertight mass being required." For the rest, he warns against making the mixture too sloppy ;" and then, as an *essential* matter, requires the concrete to be kept moist when *in situ* to prevent it drying before true "setting" has taken place. For this purpose, water must be sprinkled or squirted on to the surface of the concrete, and also the centering underneath continuously for several hours immediately after laying, gradually lessening attention till about a week old: then only an occasional watering will suffice during the next fortnight at least—the longer the better."

In regard to the steel employed, Mr. PRICE advises it "should in every case be placed ready for inspection by a responsible Officer before concreting is commenced."

The article finishes with the following statement:—"Contraction of concrete is greater in hot, as compared with temperate climates, and therefore such large areas of flooring or roofing cannot be taken. Joints in sections must be allowed for, to prevent unseemly, ragged, and detrimentally effective cracks developing later in the work."

[The above are construction details which normally fall within the function of the engineer, and should be left to him; but it is of advantage for the sanitarian to know that, if care be taken in execution, there is no reason why because a hot climate is concerned his preference, on sanitary grounds, for reinforced concrete in certain structures should not be met. Mr. PRICE'S paper in emphasizing the necessity for careful watering of cement work during setting (which, in practice, must rest with subordinate engineering staffs) points to an item liable to be perfunctorily performed, which, *ceteris paribus*, is a frequent cause of failure.]

ECONOMY IN STRUCTURE.

The Chief Engineer, D.P.W., Madras Presidency, in reference to a type plan for market buildings has issued the following memorandum (Procs. San. Board Madras No. $\frac{884}{8}$, 2nd Nov. 1917):—

> "It is observed that, in many of the designs submitted for couple roofs, the collars are placed far too high up. This is objectionable especially in cases in which the collars are let into the rafters.
>
> "For general guidance the following rules on the subject should be adopted:—
>
> "(1) For spans up to 10 feet (clear), a single collar is considered sufficient and it should be fixed to the rafters just above the level of wall plates.
>
> "(2) For spans from 12 to 14 feet (clear), two collars should be provided, one just above the level of the wall plates and the other about half way up the rafters.
>
> "(3) In all couple roofs, the collars should be simply spiked or bolted to the rafters and the rafters should on no account be cut or notched to receive the collars."

OVERCROWDING AND TRAMWAYS.

In the Madras City Corporation Report for 1916-17 the President (dealing with a population of over 500,000, large numbers of the labouring class of which are in overcrowded dwellings) gives the following definite opinion as to relief of congestion to be obtained by the use of tramways:—

> "As in the Report of 1915-16, I reiterate my belief in the absolute necessity, from the sanitarian's point of view, of tramway extension, and my hope for a speedy sanction by Government of the programme submitted by the Tramway Company. 'Relief of overcrowding' is an idle phrase, unless extension of cheap and rapid communications there be to lend reality to it."

METEOROLOGY AND TOWN PLANNING.

In the Review by the Government of the Punjab of Municipal Administration during 1916-17 a record of an extraordinary rainfall, as a factor in town planning, is afforded :—

> "In July 1916 *nine inches of rain in five hours* [italics not in original] destroyed a large part of the town of Muktsar; rebuilding has been carried out in accordance with a regular scheme that will greatly improve the town, and proposals have been made with a view to saving it from floods in future."

VITAL STATISTICS.

East Africa.

In the abstract of official statistics on p. 381, concerning East Africa, if the lamentable toll of life on active service in the country's cause be excluded, there is evidence that life for the European year by year is being subjected to less risk, *pari passu* with improved sanitary circumstances. This is specially marked in the case of East Africa and Uganda.

Results in Zanzibar and Somaliland are obviously inferior. In both of these, however, it must be remembered that the total population of officials dealt with is very small, and that a coincidence of casualties may at times produce exaggerated ratios.

Deaths.

Year.	EastAfrica. Rate per 1,000.	Uganda. Rate per 1,000.	Nyasaland. Rate per 1,000.	Zanzibar. Rate per 1,000.	Somaliland. Rate per 1,000.
1910	14·5	14·2	22·6	Not known	—
1911	13·6	13·4	—		43·5
1912	9·1	7·9	—		85·2
1913	10·2	—	6·7		38·5
1914 (a) ..	7·6	21·2	18·7	38·5	30·3
(b) ..	5·4	10·6			
1915	6·2	10·5	6·3	Nil	57·1
1916 (a) ..	12·1	7·4	29·8	17·9	—
(b) ..	7·6	—	22·4	—	28·6
Invalidings.					
1910	14·5	42·6	—	Not known	150
1911	6·8	13·4	22·7		87
1912	4·6	19·8	21·9		Nil
1913	9·0	7·2	20·1		38·5
1914 (a) ..	9·8		18·7	19·2	Nil
(b) ..	8·7	24·7	12·5		
1915 (a) ..	13·4		50·3	18·5	85·7
(b) ..	11·3	13·9	44·2		
1916	10·9	18·4	29·8	Nil	57·1

(a) Includes active service casualties.
(b) Excludes active service casualties.

The following remarks in the official publication aid the interpretation of the Tables :—

"The rate for Somaliland still remains high owing to the retirement on pension, for reasons of ill-health, of two officials, each with nearly twelve years' service in the trying climate of that Protectorate.

"From the particulars given below it will be seen that about fifty per cent. of the invalidings are due to nervous and mental troubles."*

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* [See this *Bulletin* (Sanitation No.) Vol. 4, No. 4, August 15, 1914, p. 216. It is probable that irrespective of the predisposing influence of a tropical climate, solitary life incidental to certain forms of official duty in which congenial European companionship is rare, is accompanied by undesirable introspection. Life "in small stations" is, on this account specially liable to excite minor phases of "nervous and mental trouble."]

Return giving Particulars of Officials who left the Service during 1916.

Protectorate.		Average No. in Service.	Deaths Rate per 1000.	Invalidings (including Officers Pensioned owing to Ill-health).			Total No who left the Service.	Average age on Termination.	Average Length of Service on Termination.	
				Rate per 1000	Average length of Service.					
					yrs.	m.			yrs.	m.
East Africa Prot.	(a) ..	916	12·0	10·9	9	8	76	35	4	4
	(b) ..	—	7·6							
Uganda ..	..	272	7·3	18·4	9	3	16	34	5	9
Nyasaland	(a) ..	134	29·8	29·8	2	10	12	31	3	11
	(b) ..	—	22·4							
Zanzibar	(a) ..	56	17·9	—	—		6	33	3	0
Somaliland ..	..	35	28·6	57·1	11	5	10	37	3	4
Totals	(a) ..	1413	13·4	14·9	7	4	119	34	4	2
	(b) ..	—	9·2							

(a) Includes active service casualties.
(b) Excludes active service casualties.

> "These statistics now include only the ordinary civil establishments of the Protectorates, and not officers of the King's African Rifles. . . . Particulars of Zanzibar officials are not available prior to 1911.
>
> "10·9 per cent. and 17·6 per cent. respectively of the total number who left the service were due to deaths and invalidings. The remainder were due to retirements on pension on grounds of age, completion of agreements, resignations, etc.
>
> "In reckoning the length of service of officials the time spent on voyages to and from East Africa and leave in Europe has been included. The actual period spent in East Africa may be put roughly at four fifths of the total service. . . .
>
> "Officers pensioned had at least ten years' service in East Africa, except in cases of transfer from pensionable appointments elsewhere."

ANGUILLA.

The Medical Report of the Presidency of St. Christophers and Nevis for 1916 (Senior Medical Officer, W. H. FRETZ) shows that the little population of Anguilla (4,671) had no reason to envy the health conditions of its neighbours, if vital statistics be maintained with equal accuracy. The results reported [p. 1] are as follows: -

Locality.	Birth-rate.	Death rate.
St. Kitts	30·3	26·9
Nevis	32·1	17·1
Anguilla	31·6	11·9

Dr. BURTON, the Medical Officer of Anguilla, gives the following account of sanitary conditions [pp. 3-4]: -

> "The health of the island during 1916 has been excellent. No epidemic of any kind occurred during the year. The sanitary conditions in and around the dwellings continue excellent, and this in spite of the scarcity of water. Even for washing purposes it is at a premium in this island at certain seasons. The total number of deaths for the year was 66, of which 54 were medically certified. No successful vaccinations were performed this year owing to failure of lymph."

Whilst the islanders may be sympathized with as to the absence of means of personal cleanliness, it is possible they may have the consolation of absence of inimical effects of imperfectly removed waste water. But, as the figures stand, in contrast with those of its neighbours, they are sufficiently encouraging to give rise to the hope that "after the war" to the excellent condition "in and around dwellings" may be added a sanitarily sound water-supply, and a further reduction of mortality.

FIJI.

According to the Annual Report of the Medical Department, Fiji, for 1916 (Chief Medical Officer Dr. G. W. A. LYNCH) in a population of 163,565, in Fiji, 4,705 are Europeans, 59,565 Indians, and 90,429 Fijians—the rest being, in fairly equal proportions, half-castes, Polynesians and Rotumans, with a few of the ubiquitous Chinese and "others." The birth-rate for Europeans was 16. The rates for three preceding years were 21·85, 22·11 and 27·89. The rates in 1916 were 34·50 and 36·09 for Fijians and Indians, respectively. For these races also, there is a tendency to decrease of rates compared to previous year. The Chief Medical Officer apparently sees no reason to ascribe these results to pathological influences; he holds that "the same causes which influence the falling birth-rate in so many countries influence them also in Fiji."

TETANUS IN VENEZUELA

In an estimated population of 2,821,951, Venezuela (*Public Health Reports*, 1917) had in 12 years a total of 685,952 deaths from all causes, of which 7.5 per cent. were due to tetanus; whilst of the total tetanus cases 40 per cent. were in infants.

BOOK REVIEW.

Standard Methods for the Examination of Water and Sewage. xvi + 115 pp. Third Edition. 1917. Boston, 126, Massachusetts Avenue: American Public Health Association.

In Applied Hygiene, it has become increasingly evident as the mass of knowledge rendered available by the Bacteriologist and Chemist has accumulated, that technique, as advised by various authorities, differs to an extent liable to trammel advance. Thus language used to describe results, when the technique by which they were arrived at has been dissected in controversy, at times, has been found literally to imply "the same thing only different." Consequently, it has long been held as likely to prove of advantage were defined methods generally followed in conducting bacteriological or chemical investigation, so that conclusions arrived at would permit ready comparison. For instance, in every day practice in respect to water, loose methods of citing *B. coli* without differentiation as implying faecal contamination and, in the chemical analysis, reference at one time to constituents as parts per million or per 100,000, at another as grains per gallon imperial or U.S., do not conduce to rapid cerebration in deciding hygienic value. But if in contesting the results of an examination (say, by an interested water company) it were possible to prove that the manner of collecting and transport of specimens did not take cognizance of bacteriological or chemical purity, or that technique of examination omitted to exclude certain factors, doubt may well be thrown on the whole procedure. Whilst therefore it would be a mistake to trammel exploitation of new methods, it is evident that general adoption of standard laboratory methods must result in economy of time and in clearness of conception of hygienic values.

The task of arriving at standards by the process of exclusion of diverse opinions of various authorities, is one that might well appal an individual worker. In any case, an *ipse dixit* standard would receive little attention, even from the hands of the best recognised authorities.

It has been reserved for the Americans not only to see the necessity for laying down standards, but to perceive these must be dictated impersonally by recognised corporate Bodies. The third edition of "Standard Methods for the Examination of Water and Sewage" is the outcome of consultations by the American Public Health Association, American Chemical Society and the referees of the Association of Official Agricultural Chemists. This book embodies a remarkably concise and lucid set of rulings as to both chemical and bacteriological procedure.

It would certainly aid sanitary advance if, either formally or informally these rulings were adopted on this side of the Atlantic. It would be a great matter, in the presence of common sentiment and a common language, that in the readily available literature of both nations, advantage should be taken of accepted standards in describing results of investigations. Indeed, if already it has been feasible to establish an "Office International d'Hygiene Publique" (in the creation of which Germany did not participate) which still publishes its monthly Bulletin, it should not require much effort to secure, on the basis of the American effort, an International version of "Standard Methods." The advent of peace may bring with it this possibility; but, in the meantime, the wide use of the book in medical schools and laboratories would render this consummation practicable.

Throughout this work, there is strict adherence to the principle that methods of procedure and not sanitary interpretations of results are under consideration. The Committee however make one exception, which is certainly well warranted in reference to the varied findings of recent years; a warning is thus conveyed:—"The Committee feels that a word of caution should be given regarding the significance of the presence in a water of members of the *B. coli* group as defined in this report. Recent work seems to indicate that the *B. coli* group as herein defined consists of organisms of both faecal and non-faecal origin. Therefore, care must be exercised in judging the sanitary quality of a water solely from the determination of the presence of members of the group." This caution would seem specially applicable to work in the tropics, where the *B. coli* is peculiarly elusive in surface water, and where its absence, notwithstanding recent contamination, would be dangerously misleading. Indeed, as shown by Clemesha (to whom science is indebted for this* and other allied facts as to behaviour of water borne microbes under natural conditions in the tropics) eighteen hours exposure to sunlight conditions may suffice to secure complete removal of *B. coli*, necessitating greater reliance being placed on the more resisting representatives of faecal pollution.

In the nature of things it cannot be expected that any set of standard rulings can be applicable for all time; changes must be expected at even shorter intervals than have afflicted the British Pharmacopoeia. Indeed, if in the laboratory pet methods (alias "tips") are to be put aside for standard methods it is but "human" that preference for other procedures be expressed. Already the "standard methods" have been attacked by Passed Assistant Surgeon H. E. Hasseltine.† He contends that "if the New Standard Methods be adhered to in the bacteriological examinations of water, time lapse and material will be unnecessarily expended and untrustworthy results may be obtained."

On the particular ground selected (identification of typical *B. coli*) in this criticism, there would appear to be room for the discussion as to material and labour expended, but there would seem little for the suggestion that "misleading results" are obtainable; provided not a part but the whole procedure of the "standard methods" be followed. It is however an important feature of a work embracing "standard methods" that the procedures should not be the outcome of individual opinion, but the crystalized products of material that has withstood the solvent action of criticism. Hence healthy criticisms such as launched by Asst. Surg. Hasseltine will not result in further diversified opinions, but in a consolidation of impartial findings when, in due course, the advance of Chemistry and Bacteriology necessitates a new edition.

W. G. K.

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* The Bacteriology of Surface Water in the Tropics, by Major W. W. Clemesha, I.M.S., Sanitary Commissioner with the Government of India. pp. 61 70

† *Public Health Reports.* 1917. Nov. 9. Vol. 32 No. 45.

CORRESPONDENCE

DANIELS & NEWHAM: Laboratory Studies in Tropical Medicine

Dear Sir,

Your Editorial Note on page 316 of the April issue seems to call for some explanation from us as publishers, especially in connection with Dr. Daniels's remark: "I think the practice of many editors of sending marked copies from the Editor is worthy of imitation, but this review I have seen *through the kindness of a friend*."

Apparently owing to an oversight at the Journal, the copy containing the review only reached us on April 16th. The same day we communicated with one of the authors. One may assume therefore that Dr. Daniels' attention was called to the matter before that date, but this does not remove the implied neglect by the publishers which your note seems to convey.

In fairness to ourselves we ask that the same publicity may be given to this explanation as has been given to the Editor's note.

Yours faithfully,

[*Signed*] John Bale, Sons & Danielsson, Ltd.

Messrs. Bale, Sons & Danielsson are quite correct. The publishers' copy had not been sent when Dr. Daniels wrote and the omission was not detected till the note had been passed for press. In any case there was no intention to impute neglect to the publishers; the custom in this matter probably varies. [Ed.]

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 11.] 1918. [No. 6.

TROPICAL DISEASES OF THE SKIN.

KING (W. W.). **Some Observations upon the Skin Diseases of Porto Rico.**—*Jl. Cutan. Dis. Including Syph.* 1917. Aug. Vol. 35. No. 6. (Whole No. 417.) pp. 459–478. With 2 plates.

The chief value of this paper lies in the personal experience of the incidence of skin diseases in Porto Rico. Pyosis tropica, a group of diseases which includes the chronic ecthymatous ulcerations, was very common, as indeed were all pyogenic conditions. The author questions whether there is a specific ulcer which deserves the name of "ulcus tropicum." Oriental sore, Leishmaniasis, was not met with. Sporotrichosis was suspected in a few cases but its presence was never demonstrated. Oidiomycosis (ulcerations shewing yeast organisms), occurred more than once, but it is explained that this may have been the result of a contamination. The incidence of ringworm is particularly interesting. Tinea capitis and tinea barbae were very rare. Tinea corporis was very common, and especially in the form of tinea cruris, of the clinical type now often described as "eczematoid ringworm of the groin and extremities," and due usually to the Epidermophyton, much less often to the Trichophytons. Of the latter, tinea flava was the most frequent. Trichomycosis, formerly better known under the name of "Lepothrix," was very prevalent especially of the red variety. Blastomycosis, which the author with his American experience was naturally on the look out for, was not found. It is again interesting to note that psoriasis was only twice encountered, and scabies and pediculosis were uncommon. A curious and perhaps specific verruca occurring on the feet and hands was very prevalent, but specificity was not definitely established. Uncinariasis, due to infection by the American hook worm, was very widespread, and seems to have been frequently associated with pellagra. Filariasis was common.

Syphilis was extensively distributed and of an early-ulcerative type. Yaws on the other hand was rare. Leprosy has become much less prevalent, a result, as the author suggests, of segregation.

E. G. Graham Little.

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HILL (Chas. H.); SOUTER (C. H.); MALCOLM (Robert A. G.). **Barcoo Rot.** [Correspondence].—*Med. Jl. Australia.* 1917. Sept. 29. Vol. 2. 4th Year. No. 13. p. 283; Oct. 20. No. 16. p. 347

PAIN (Francis); STANNUS (H. S.). **Barcoo Rot (Veldt Sore).** *Brit. Med. Jl.* 1917. Oct. 6. p. 468; 1918. Feb. 23. pp. 231 232.

Hill, after a long experience, recommends the administration of hypophosphites, with no local treatment beyond the protection of the ulcers from flies, etc.

Souter derives the word Barcoo from Barcoo Creek, which he places in New South Wales, and recommends the administration of sulphate of calcium in one grain pills two or three times a day, combined with local treatment directed to prevent further infection of the sores.

Malcolm supports the latter measure, and ascribes the causation to exposure under dry atmospheric conditions.

Pain expresses the opinion that "Barcoo Rot" as originally experienced by older bushmen was scurvy; at present the term is used for any obstinate "sore"; most of the cases are actually staphylococcic or trichophytic infections.

Stannus (of Nyasaland) supports the view that diminished resistance in the individual contributes to the severity of the infection and finds malaria and scurvy the most important contributory causes. He found an ointment of 20 gr. to the ounce of Acid. Sal. "uniformly successful." [See also this *Bulletin*, Vol 10, p. 207.]

E. G. G. L.

PRIESTLEY (Henry). **Ringworm and Allied Parasitic Skin Diseases in Australia.**—*Med. Jl. Australia.* 1917. Dec. 8. Vol. 2. 4th Year. No. 23. pp. 471–475. With 13 figs.

The first part of this paper is a good "text-book" description of methods of examination and classification of ringworm fungi. The author describes minutely two species which he claims as "new," isolated in Townsville. The first grew a yellow or white culture, with red discoloration of glucose agar media. The second was probably an Epidermophyton.

E. G. G. L.

PAUL (C. Norman). **A Ringworm Epidemic presenting a New Type of Fungus.**—*Med. Jl. Australia.* 1917. Dec. 15. Vol. 2. 4th Year. No. 24. pp. 496–497. With 3 figs.

A widespread epidemic amongst persons handling wheat was traced to mice, as the carrier; a fungus was grown on proof media, the culture assuming a purple-lake colour on the 8th day. It is a new variety of the Gypseum group.

E. G. G. L.

PIJPER (A.). **Tinea imbricata in South Africa.**—*Jl. Trop. Med. & Hyg.* 1918. Mar. 1. Vol. 21. No. 5. pp. 45–47. With 3 figs.

——. **Some Unusual Infections. VI.—Tinea imbricata**—*Med. Jl. S. Africa.* 1917. June. Vol. 12. No. 11. pp. 176–177. With 1 fig.

Both these papers refer to the same case, a Mapoch-kaffir, aged 40–50, from whom fungus-bearing scales were removed, and by an ingenious device a pure culture in glucose broth of fungus uncontaminated by other organisms was obtained. This was successfully regrown on Sabouraud's solid proof medium, but no experiments at inoculation of human beings were attempted. Demonstration is therefore lacking as to the isolated fungus being actually the cause of the disease, but the cultural and clinical characteristics are, the author thinks, sufficiently like those described in Tinea imbricata to warrant the identification he claims to make.

E. G. G. L.

Pupo (João de Aguiar). **Frequencia da Sporotrichose em S. Paulo.** [The Frequency of Sporotrichosis in San Paulo.]—*Ann. Paulist. Med. e Cirurg.* 1917. Mar. Year 5. Vol. 8. No. 3. pp. 53–68. With 10 figs.

Notes of 20 cases of sporotrichosis occurring in the author's practice, most of which were very successfully treated by endovenous injections of iodide of sodium in doses of 5 to 10 cubic centimetres of a 10 per cent. solution, the chief difficulty being to get the patients to attend the out-patient department with proper regularity. The 20 cases occurred among a total of 5,500 out-patients treated in the course of two years at a Clinique for Diseases of the Skin and Syphilis, which gives an idea of the frequency of the affection in Brazil. The paper is illustrated by a number of very good photographic reproductions of characteristic lesions. The common Sporotrichum of Brazil is *S. beurmanni.*

J. B. Nias.

Chalmers (Albert J.) & Archibald (R. G.). **Mycetoma and Pseudomycetomatous Formations.**—*New Orleans Med. & Surg. Jl.* 1917. Nov. Vol. 70. No. 5. pp. 455–475. With 3 plates.

Chalmers and Archibald contribute an important paper on the classification and description of this group which they define as follows.

"The term *Mycetoma* includes all growths and granulations which produce enlargement, deformity or destruction in any portion of the tissues of men, or animals, and which are caused by the invasion of the affected area by fungi, belonging to different genera and species, which produce bodies of varying dimensions, color and shape composed of hyphae, and sometimes chlamydospores, embedded in a matrix. These bodies, which are capable of giving rise to mycelial filaments on germination, are termed *grains* and are found either embedded in the pathological tissue forming those growths and granulations, or escaping freely in the discharge therefrom."

A second group of cases in which the grains are smaller or not identified, but in which fungus is found, the authors propose to classify as paramycetoma. A third group of cases with clinical resemblances to the two classes described, but without demostration of the fungus causation they call pseudomycetoma. The mycetomata may be divided into two great classes, 1. Grains containing large segmented mycelial filaments—Maduromycoses. 2. Grains containing very fine segmented mycelial filaments looking like bacilli embedded in a matrix -Actinomycoses.

The Maduromycoses may be further differentiated by the colour of the grains, into (1) black, (2) white or yellow and (3) red varieties.

These again may be classified according to their geographical distribution, as European, Asian, African and American, and there are numerous individual species of each, named for the most part after the recorder.

The Actinomycoses may be similarly divided, into (1) black, (2) yellow, and (3) red, (sometimes yellowish) varieties.

The Paramycetomata may show one or more of the following four macroscopical characters :—

1. Presence of eosinophil bodies, the so called Russell bodies, which the authors regard as a chemical defence provided by the fungus.
2. Nocardial filaments.
3. Minute grains containing Nocardial filaments.
4. Very rarely, other organisms, septate and broader than a Nocardia or Streptothrix.

The Pseudomycetomata include a number of clinical conditions such as malignant tumours, yaws, etc., which need not be further specified.

The treatment recommended for all forms of mycetoma is early and complete removal with the lymphatic glands in connection with the growth. Where removal is impossible, the administration of large doses, such as ninety grains per diem, of potassium iodide, and the administration of autogenous vaccines may be of some use in Actinomycoses, but no measure short of removal has been of use in the Maduromycoses.

E. G. G. L.

MIESCHER (Guido). **Ueber einen Fall von Mycetoma pedis nostras. Verursacht durch eine neue pathogene Streptothrix, nebst Bemerkungen zur Systematik der Trichomyzeten (Streptothrix, Aktinomyzes).** [A Case of Mycetoma pedis nostras. Caused by a New Streptothrix.]—*Arch. Dermat. u. Syph. Orig.* 1917. Vol. 124. No. 2. pp. 297–442. With 5 plates.

This is an elaborate and very long paper describing a new case and classifying the previous cases recorded. It contains a very detailed research on the new observation. The patient was a man aged 50, a native of Italy, who had lived during the thirty years preceding the observation in Basel. In 1914 a tub containing ice was dropped on his foot, causing a haematoma on the dorsum, with swelling, but no wound. Some six months later a nodule had developed on the site, and this was incised, and was found to contain blood-stained pus in which very small yellow bodies were present from which cultures were made; Miescher claims that he has thus isolated a new Streptothrix, which as it forms very warty growths he names *Streptothrix verrucosa.* It was grown in numerous media, in pure culture, producing salmon-red to brick-red colonies; it is aerobic, growing best on carbohydrate and bouillon, less well on serum, agar, and gelatine. Conidia were not found, and aerial hyphae were inconstant. A very characteristic feature on which the author insists much is the early fragmentation of the mycelium, so that bodies like bacilli and cocci result. The organism is Gram positive, and holds Ziehl's stain. In dogs, cats, and doubtfully in guinea pigs inoculation produced granulation tumours, from which the same fungus was recovered in pure culture.

The treatment adopted combined internal administration of large doses of potassium iodide with local application of a pyrogallol gelanthum, by which the patient was "clinically" cured. Some recurrences were treated in the same way, and the patient ultimately died of tuberculosis three years after the initial accident.

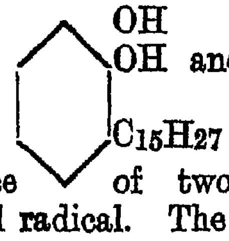
E. G. G. L.

DE KORTÉ (W. E.). *Nocardia cylindracea*: **A South African Otomycosis.**—*Ann. Trop. Med. & Parasit.* 1918. Jan. 31. Vol. 11. No. 3. pp. 265–278. With 2 plates.

A man aged 50 while loading forage pricked his ear, which subsequently swelled and discharged, the discharge smelling of "old boot leather." Under large doses of potassium iodide, 45 grains subsequently increased to 90 grains per diem, improvement after six months was so slow that a vaccine was tried, prepared from an acidfast organism obtained from the pus. There was a severe local and constitutional reaction, and ultimately a considerable improvement in the local symptoms, but the patient's health suffered from the inoculations and they were stopped, and the case was lost sight of. From a sixty days old culture obtained from the pus an acid-fast bacillus was grown after 60 days aerobic incubation, producing an "old leather like" smell. This form the author calls the Oidial. From the same original culture from the pus after 220 days, a growth of non-acid-fast spore-bearing hyphae was obtained; this the author calls the Arthroidial. Grain-like bodies were also observed consisting of Gram-negative non-acid-fast "mycelium," like actinomycosis hominis. This mycelium the author regards as an artificial product. The phases of the parasite were conditioned by age and environment; from the appearance of the original growth in glucose-agar shake cultures, when curved lamellae developed, the author names the organisms "cylindracea." He suggests that the "mycelium" and "arthroidial" may be heteroecious phases in another host, i.e., forage.

E. G. G. L.

TOYAMA (I.). **Rhus Dermatitis.**—*Jl. Cutan. Dis. Including Syph.* 1918. Mar. Vol. 36. No. 3. (Whole No. 424.) pp. 157–165.

Toyama discusses the injurious principle in rhus plants, six species of which grow wild in Japan, the most familiar to us being the *Rhus toxicodendron*. The subject has a special industrial importance in Japan as the native lacquer contains this injurious ingredient. The author offers very convincing arguments for the view that the active principle is a chemical product, urushiol, obtained from the sap of the lacquer tree. This product caused the same effects as the rhus plants. The formula of urushiol is stated to be 

and the author ascribes its special toxicity to the presence of two hydroxyl radicals and an adjoining unsaturated alkyl radical. The poisonous principle is non-volatile, but the action may be produced apparently at a distance, an effect which is explained by the carriage of small particles of the irritating substance by wind or insects. New lacquer ware is more likely to produce ill effects than old. Nevertheless the author was able to prove experimentally that an ethereal solution of lacquer derived from an antique vase buried a thousand years ago retained its poisonous qualities.

Lacquer dermatitis is best treated by the application of an alkaline solution, which neutralises the urushiol, and the removal of traces of lacquer by a 10 per cent. solution of nitric acid in alcohol.

E. G. G. L.

McNair (James B.). **The Poisonous Principle of Poison Oak, Non-Bacterial.**—*Med. Record.* 1917. June 16. Vol. 91. No. 24. (Whole No. 2432.) pp. 1042–1043.

McNair in this paper adduces some sound arguments for the non-bacterial nature of the poison of Rhus plants, the most convincing of which is the indestructibility of the injurious principle by prolonged heat or exposure to antiseptics.

E. G. G. L.

Leger (M.) & Mouzels (P.). **Dermatose prurigineuse déterminée par des Papillons saturnides du genre *Hylesia*.**—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 104–107. With 1 fig.

This relates to a personal experience of one of the authors in French Guiana who suffered an attack which was traced to a butterfly crushed against his waistcoat. Two other similar cases are recorded. The active principle seems to be a chemical irritant extracted by water but not by alcohol, and probably conveyed by the minute spicules which constitute the velvety down on the abdomen and wings and are easily detached. The insects are said to belong to the family Saturnidae, genus *Hylesia*, or one nearly allied to it.

E. G. G. L.

Ōhno (Takeshi). **Ueber den giftigen Nachtschmetterling im Präfektur Niigata. (I. Mitteilung).** [A Poisonous Moth in Niigata.] [Japanese text.]—*Japan. Ztschr. f. Dermatol. u. Urol.* 1917. July. Vol. 17. No. 7. pp. 599–609. With 1 plate. [Author's summary in German p. 26.]

Ohno has conducted a morphological, biological and experimental research on a poisonous moth found especially in the summer in Niigata. The powder from the wings and body of this moth produces in contact with human skin a violent urticarial eruption, histological sections of the skin shewing all the appearances of acute urticaria. Examination of the powder shews the presence of numerous microscopic needle-like bodies with a pale violet fluid substance in the lumen, and the irritant effect is probably to be explained by a combined mechanical and chemical cause. Numerous experiments with animals failed to afford any means of producing immunisation against the irritant.

E. G. G. L.

SCHMITZ (Franz). **Akute hämorrhagische Nephritis nach Raupenurtikaria.** [Acute Haemorrhagic Nephritis following Caterpillar Urticaria.]—*Münch. Med. Woch.* 1917. Nov. 27. Vol. 64. No. 48. p. 1558.

A doctor was the subject of a severe urticaria as the result of contact with a hairy caterpillar prevalent in Rumania, and known to produce this symptom. The eruption faded in about five days, but was followed by an acute haemorrhagic nephritis, with severe constitutional symptoms, albuminuria persisting for several weeks.

E. G. G. L.

CHALMERS (Albert J.) & KING (Harold H.). **Blister Beetles as a Public Nuisance.**—*New Orleans Med. & Surg. Jl.* 1917. Nov. Vol. 70. No. 5. pp. 445–455. With 6 figs.

This paper describes an epidemic of a bullous cruption which occurred in Khartoum in August 1916, and was caused by contact with beetles two species of which were identified, *Epicauta sapphirina* and *Epicauta tomentosa.* It was principally confined to Europeans, was met with in Egyptians but not in natives of the Soudan. The epidemic ceased in about four weeks with the disappearance of the beetles.

E. G. G. L.

VON BASSEWITZ (E.). **O Micuim.** [Micuim.]—*Brazil Medico.* 1917. Apr. 7 & 14. Vol. 31. Nos. 14 & 15. pp. 115–116; 122–124.

"Micuim" is the popular name in Brazil of the larval hexapod stage of an Acaroid insect which the author has not been able hitherto to identify perfectly. It is very abundant in dry summers in the grass of many districts of Brazil and, being carnivorous, attaches itself to the skin of both human beings and animals. It is of a bright red colour, about 0·35 mm. broad by 0·5 mm. long, having three pairs of legs which are terminated by three claws. In the middle of the back are two bright red spots which are the organs of vision. The insect is very active and can travel over a distance of 15 centimetres in a minute, as the author has observed. Its colour is due to an oily secretion upon the skin. It ranges rapidly all over the body of the individual attacked, particularly affecting the folds of the thinner portions of the skin, and by its biting or scratching it causes an intense dermatitis, very similar to that which is caused by the ordinary harvest-bug. It does not appear actually to suck blood, as no red cells are to be found in its intestine. Probably it feeds upon the exuded serum of the skin. The author's endeavours to grow this parasite into the perfect sexual form have not hitherto been successful, so that its classificatory position still remains doubtful. The adult insect presumably lives on plants. The "Micuim," according to the author, cannot be identified with *Tetranychus molestissimus* (WEYENBERGH), which in the adult stage is found upon the plant *Xanthium macrocarpum,* this insect being known in Brazil by the separate name of "Carrapicho." Specimens of Micuim larva sent to the eminent acarologist G. HALLER by Dr. Carlos BERGH were simply referred by him to the genus *Tetranychus.*

The symptoms occasioned by this Acarus larva seem to have been first described by the French botanist Auguste DE SAINT-HILAIRE, as long ago as 1821, in his *Voyage a Rio Grande do Sul* (p. 266). The dermatitis caused by the irritation and scratching may prove fatal to old and debilitated individuals in the human subject, and amongst quadrupeds and poultry a similar result may occur. Several parasiticides can be used with good effect against the condition, the best being tincture of benzoin, or balsam of Peru, and the powder and tincture of pyrethrum. Solution of menthol in vaseline is also good, and relieves the itching at the same time. More popular remedies are rum or an alcoholic tincture of tobacco, and creolin soap.

J. B. N.

TOTSUKA (R.). **[Oil Eczema, a Kind of Skin Disease produced by Continued Contact with Turpentine, Kerosene and Machine Oils.]**—*Hifukwa Hitsunyokwa Zasshi* (*Japan. Ztschr. f. Derm. u. Urol.*). 1917. May 20. Vol. 17. No. 5. pp. 1–56. With 8 figs. [From Review by R. G. MILLS.]

This is an occupation dermatitis with which we are familiar in our industrial centres. It is a more or less chronic folliculitis resulting from an irritative inflammation of the hair follicle. Machine oils are the most effective in producing it. Women are more subject to it than men, and there is probably an individual idiosyncracy.

E. G. G. L.

SPICK. **Traitement de l'ulcère phagédénique des pays chauds.** *Caducée.* 1917. Aug. 15. Vol. 17. No. 8. pp. 101–103.

Spick writes on this subject with an experience much enlarged by the movements of native troops occasioned by the war; he recommends the following treatment. The wound is cleaned with hydrogen peroxide and the edges cut with scissors, the surface dried and powdered freely with iodoform. A red hot cautery is then passed over the iodoform in the wound by which means clouds of nascent iodine are generated. The wound is then again powdered with iodoform and covered with sterile gauze. The aseptic dressing is renewed daily and every fourth day the cauterisation of the iodoformed surface is repeated. In seven cases arsenobenzol was used as well, in intravenous injections, four doses respectively of 15, 30, 45 and 60 cgms. being given at six days interval.

E. G. G. L.

GOLDBERG (L.). **Beitrag zur Therapie des Ulcus tropicum phagedaenicum (Jemen).** [The Treatment of Phagedenic Ulcer.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. May. Vol. 21. No. 9. pp. 154–156. With 2 figs.

Goldberg in this communication describes the cure of a longstanding phagedenic ulcer of the foot, in which a spirochaete and fusiform bacillus had been identified, treatment having consisted in the local application of an ointment of neosalvarsan ½ per cent. and nitrate of silver. Healing took place within 2½ months, although the ulceration had been present for 26 years.

E. G. G. L.

SILVA (Flaviano). **O azul de methyleno no tratamento da ulcera tropical phagedenica.** [Methylene Blue in the Treatment of Tropical Ulcer.]—*Brazil Medico.* 1917. Apr. 14. Vol. 31. No. 15. pp. 124–125.

A case of ulcer of the foot successfully treated by the local application of methylene blue. The diagnosis was verified microscopically by the finding of *B. fusiformis* and its associated spirillum in the discharge. The borders of the ulcer having been excised, the surface of the sore was covered with a layer of cotton wool soaked in a 2 per cent. watery solution of methylene blue. The dressing was changed every day, and the sloughs carefully picked off. Immediate relief to the symptoms was obtained, and ultimately the surface cicatrized completely. Microscopic examinations made during the process of cure showed that the bacilli disappeared first, whilst the spirilla remained present longer.

J. B. N.

CURJEL (Dagmar Florence). i. **Ulcerating Granuloma of the Pudenda.**—*Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 305–310.
ii. **Treatment of Ulcerative Granuloma.** [Correspondence.]—*Ibid.* Oct. No. 10. p. 379.

i. Curjel contributes in this paper a personal experience of twenty cases of granuloma inguinale, all in women, and suggests that a specific virus, not however identified, is the cause, and that it is venereal in origin. Contrary to the experience of the disease hitherto seen chiefly in males, there was enlargement of the inguinal glands, but there was no evidence of systemic infection. An unusually large proportion of the cases shewed a positive Wassermann reaction, to be explained probably as due to a concurrent syphilitic inoculation. Treatment recommended consists in the application of X-rays, or the excision of the affected parts.

ii. The author here comments on the treatment of ulcerative granuloma by intravenous injection of antimony, which requires to be pushed to limits of toleration and probably acts as a general protoplasmic poison, with no specificity.

E. G. G. L.

PIJPER (A.). **On the Aetiology of Granuloma venereum.**—*S. African Med. Rec.* 1918. Jan. 26. Vol. 16. No. 2. pp. 20–26. With 3 figs.

The author reviews the literature and describes a new case of this disease occurring in a Kaffir. Smears taken from the surface revealed no specific organism, some spirochaetes of the *Spirochaeta buccalis* type excepted. Cultures from the deeper parts were negative. Sections of the skin shewed elongated interpapillary processes, with in places destruction of the epithelium. Numerous mitoses were found. Enormous numbers of plasma cells were seen in the cellular infiltration of the corium. Parasites like those described under the name of Donovan bodies were found in the epithelial cells in some parts.

E. G. G. L.

ARAGÃO (Henrique de Beaurepaire). **Notes on Granuloma Venereum.** —*New Orleans Med. & Surg. Jl.* 1917. Oct. Vol. 70. No. 4. pp. 369–374. With 2 plates & 7 text-figs.

Granuloma venereum seems to be especially common in Brazil. Aragão refers to fifty cases having been treated with tartar emetic, which he recommends in the form of intravenous injections of a 1 per cent. solution, 10 to 12 cc. being a usual dose, and a course of ten or twelve injections, to be repeated if necessary, is recommended. X-rays should where obtainable be given in addition. The author regards the Donovan bodies as being the true cause of the disease and describes very fully the characteristics of the microbe in the tissues, and he appears to have succeeded in growing it freely on all the usual laboratory media, with characters very like those of Friedlander's bacterium. Inoculations from cultures of this organism were fatal to laboratory animals, but inoculations of granulomatous tissue did not produce the disease.

E. G. G. L.

DARWENT (E. N.). **Notes on a Case of Ulcerating Granuloma treated by Intravenous Injections of Tartar Emetic.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. July. Vol. 10. No. 8. p. 198.

The patient was a negro man with ulcerating granuloma pudendi. Doses of one third of a grain of " tartar emetic " were given at intervals of two, and later of three days, intravenously, and the parts locally treated with caustics. After eight injections the ulceration had soundly healed.

E. G. G. L.

BLANCHARD (M.). **Un cas d'Oerbiss ou pseudo myiase rampante à Grand-Bassam (Côte d'Ivoire).**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 725–726.

Blanchard reports a case of this affection from Bassam, on the right foot of a man of forty who was accustomed to walk barefoot in his garden, a circumstance which gives some support to BÉRANGER-FÉRAUD's view that the disease is contracted by contact with damp earth. Cure was effected by opening up the furrows of the disease and painting with 20 per cent. nitrate of silver, at the same time encircling the lesions with a ring of the same solution.

E. G. G. L.

MACFIE (J. W. S.). **A Case of Larbish or Oerbiss observed in Northern Nigeria.**—*Jl. Trop. Med. & Hyg.* 1918. Feb. 1. Vol. 21. No. 3. p. 25. With 1 fig.

Macfie reports a case of this disease in a male European in Northern Nigeria. The lesion began on the dorsum of the right foot near the toe. Its advance was irregular in rate and direction, and formed a zigzag across the sole of the foot and inner margin. Repeated examinations were made of the seropurulent fluid found in the vesicular part of the raised line which constitutes the lesion, but no parasites were found and no light was thrown on the causation.

E. G. G. L.

ROTH (O.). **Zur Kenntnis der Dermatomyiasis.**—*Dermat. Woch.* 1917. Nov. 17. Vol. 65. No. 46. pp. 1031–1035. With 2 figs.

Roth reports a remarkable case of a man being attacked by the larvae of the *Lucilia Caesar*, a fly which lays its eggs frequently on the bodies of dead animals but very seldom on living human beings. The patient had for three weeks slept on the bare ground in a wood. The larvae were found in the genital area, where the skin was much reddened and swollen. They were about 1½ cm. long and half their body was buried in the skin; when removed by forceps a punched out hole was left, extending into the connective tissue. They shunned the light, moved very actively, and produced a slimy excretion like a weeping eczema. A phlegmonous swelling followed in the sites attacked which disappeared with antiseptic treatment. Over a hundred larvae were removed with forceps; in some cases they were found buried entirely under the skin. They apparently produced a secretion capable of dissolving the integument, and when placed on dead meat produced liquefaction. Larvae removed from the patient were found to have the stomach and intestines filled with fresh blood.

E. G. G. L.

SAKURANE (K.). **["Creeping Disease" and its Possible Relation to Ligula Infection.]**—*Hifukwa Hitsunyokwa Zasshi* (*Japan. Ztschr. f. Derm. u. Urol.*) 1917. May 20. Vol. 17. No. 5. pp. 66–67. [From Review by R. G. MILLS.]

Sakurane, from observation of a case of a swelling on the skin from which he removed a Ligula parasite, offers the suggestion that the parasite in creeping disease is of this nature, the clinical resemblances having impressed him.

E. G. G. L.

MURAKAMI (F.). **["Creeping Disease." A Linear Circinate Disease of the Skin. An Abstract.]**—*Hifukwa Hitsunyokwa Zasshi* (*Japan. Ztschr. f. Derm. u. Urol.*) 1917. May 20. Vol. 17. No. 5. p. 65. [From Review by R. G. MILLS.]

The patient, a male Japanese of otherwise good health and negative history, noticed one day a raised line on the breast near the nipple. This gradually spread in length, in circles, loops and various curves until it had covered a considerable portion of the breast. The point of advance was reddish or slightly brownish, and the colour gradually changed to dark brown in the older portions. The line was about the size of a match stick, a little raised and often nodular in character, although all the spots were directly in line. Itching was somewhat annoying. Unfortunately the patient refused to have a bit of tissue excised for examination. The lesion cleared up under an antiseptic ointment.

E. G. G. L.

PIJPER (A.). **The Aetiology of Craw-Craw.**—*Jl. Trop. Med. & Hyg.* 1917. Nov. 1. Vol. 20. No. 21. pp. 242–244. With 2 figs.

Pijper claims to have isolated a bacterium from the nodules of an eruption which he considered an example of craw-craw, using that term in the restricted sense advocated by CASTELLANI whose description he follows. Proof however of the connection of the bacterium with the causation is lacking, as the organism was not identified in sections of the skin, and although inoculations of the culture into the skin and veins of rabbits were followed by the development of nodules similar clinically to those of the human case, the bacterium was not recovered from these experimentally produced growths.

E. G. G. L.

CHALMERS (Albert J.) & KAMAR (A.). **Further Notes on Keratodermia punctata.**—*Jl. Trop. Med. & Hyg.* 1917. Oct. 1. Vol. 20. No. 19. pp. 218–219.

This is a short note, differentiating keratodermia punctata from yaws, chiefly on the ground that hyperkeratosis of the palms, common in keratoderma punctata, is not described in yaws, and from CASTELLANI's keratoma plantare sulcatum which is restricted to the feet.

E. G. G. L.

CHALMERS (Albert J.) & INNES (Arthur). **"Scarlet Fever-Like Eruptions" in the Tropics.**—*Jl. Trop. Med. & Hyg.* 1917. Sept. 1. Vol. 20. No. 17. pp. 193–197.

The authors draw a distinction between the mild hyperaemia common in the tropics, associated often with the taking of drugs like quinine, of transient duration and without desquamation, which they propose to call erythema scarlatiniforme, and a more severe definite inflammation, with desquamation and sore throat, very difficult to differentiate from true scarlet fever, which they call dermatitis scarlatiniformis. Examples of both types are given. These eruptions have sometimes coincided with the finding of bacilli in the throat, sometimes with chemical causes, and the differences in the two groups are of degree, not of kind. True scarlet fever on the other hand is extraordinarily rare in the Tropics. It is to be differentiated from the rashes mentioned above by several features, of which the most important are appearance of the eruption within 48 hours of the sore throat, the severe type of the latter, the strawberry tongue, headache, vomiting, circumoral pallor, albuminuria, and infectivity, all of which are absent in the rashes with which the paper deals. The rarity of scarlet fever in the tropics is to be kept in mind throughout; this diagnosis should not be made unless the evidence is very clear.

E. G. G. L.

CHALMERS (Albert J.) & ARCHIBALD (R. G.). **Localized Gangrenous Vaccinia.**—*Jl. Trop. Med. & Hyg.* 1917. Oct. 1. Vol. 20. No. 19. pp. 217–218.

The most careful aseptic precautions were observed in effecting the operation of vaccination in this case (a European lady in Khartoum). On the fifth day the patient felt ill and had slight fever, which rose on the sixth day to 102°, and on the seventh day to 105°. On the eighth day there was a black slough two inches in diameter in the vaccinated site, surrounded by a ring of vesicles and a red to purple area of skin

3 inches wide. The temperature fell to 103°, and the patient felt better. On the 13th day she developed an attack of acute gout, the left hip, left arm, left side of the jaw, left wrist, the back and the right ribs being chiefly affected. This attack subsided in about seven days, during which the slough came away, and the surrounding inflammation subsided. The authors attribute these very unusual results of vaccination to the diminished resistance produced by the latent gout. The treatment adopted, which was entirely successful, was to keep the leg exposed to the air in an elevated position, and to apply to the site powders, lead lotion and finally calamine lotion which was found most satisfactory of all. The gout was treated by the usual therapy.

E. G. G. L.

BHARUCHA (E. S.). **Note on a Case of Ainhum.**—*Indian Med. Gaz.* 1917. Nov. Vol. 52. No. 11. pp. 403–404. With 2 figs.

The disease affected the left little toe, the patient, a Hindu male, having lost the right little toe from a similar cause. Clinical appearances supported the diagnosis of ainhum, but the pathological report on the amputated toe suggested syphilis, marked artero-sclerosis being present. The Wassermann test was not made.

E. G. G. L.

TAKAHASHI (S.). [**Orange Colored Skin Disease. Case Report with Suggestions as to Pathogenicity.**]—*Jikwa Zasshi* (*Jl. Pediatrics*) 1917. May 20. No. 204. p. 66.

[From Review by R. G. MILLS.]

Takahashi reports a case of orange discoloration of the skin of the palms, the face and the feet of three months duration in a girl aged 6 years. The shade of colour differed from that of catarrhal jaundice. Later there appeared a consolidation at the apex of the lung, some dilatation of the liver, and a roughening of the valvular sounds of the heart.

The discolouration was described, on what would seem very insufficient evidence, to the circumstance that the child ate oranges freely. The causation was not further elucidated.

E. G. G. L.

VAN DEN BRANDEN (F.). **Syphilides psoriasiformes confluentes chez un Noir.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 688–689.

This is a short report, with photograph, of a syphilide in a negro, simulating, in a part of the eruption, psoriasis; elsewhere showing characteristic features, and disappearing after two injections of "salvarsan cuprique."

E. G. G. L.

BOUFFARD (G.). **Chéloïde géante chez un indigène du Dahomey.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 814–815. With 1 fig.

This tumour reached from the lobe of the right ear to the navel, having taken ten years to grow to this size. It was excised with complete success and found to consist entirely of fibrous tissue.

E. G. G. L.

KNOWLES (Frank Crozer). **Acnitis in the Negro.**—*Jl. Cutan. Dis. Including Syph.* 1917. Feb. Vol. 35. No. 2. (Whole No. 413.) pp. 61–65. With 1 plate & 1 fig.

The chief interest of this communication lies in the race of the patient, a negro; acnitis would seem to be rare in dark skinned peoples. The clinical and histological description presents no new features.

E. G. G. L.

BERNSTORFF. **Ueber Krätze in der Türkei während des Krieges.** [Itch in Turkey during the War.]—*Münch. Med. Woch.* 1917. Dec. 11. Vol. 64. No. 50. p. 1606. With 2 figs.

The author notes the severity of the secondary contamination of scabies prevalent among the poorer Turks, but the note offers no special interest.

E. G. G. L.

KRITZLER. **Bild eines Falles von Gangosa.** [A Case of Gangosa.]—*Ztschr. f. Arztliche Fortbildung.* 1918. Jan. 1. Vol. 15. No. 1. pp. 6–7. With 1 fig.

Kritzler contributes an illustration of this disease occurring in a patient in a Rabaul hospital; there is no indication where the disease was contracted and no details are given.

E. G. G. L.

LEPROSY.

Leger (Marcel). **La Lèpre à la Guyane française et ses réglementations successives.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 733–749.

This paper fully discusses the question of leprosy in French Guiana. In spite of the numerous Rules and Regulations which have been enacted since 1716 when it attracted serious attention, the disease has not decreased in the colony. It was not indigenous, but was supposed to be introduced by Dutch Jews, expelled from Brazil, who settled in the neighbourhood of Cayenne in the latter part of the 17th century. The author refers to a large number of writers on the subject, and the various suggestions and enactments which have been made up to the present time, apparently with but little success. Recent authorities—MM. Kermorgant, Clarac, Pain, Thézé and Henry estimate the total number of lepers in the Colony at from 300 to 350, or about 12 per 1,000 : about half of these are in the neighbourhood of Cayenne. New cases are still being discovered—5 recently by the author himself.

The terrible conditions existing at the leper settlement at Acarouany, and its failure at remedying or arresting the spread of the disease in the Colony are strongly animadverted upon. The author urges that greater publicity should be given to the whole question, and the population enlightened, and that several leproseries should be established where hygienic measures and scientific investigations can be carried out, and the patients so humanely treated that they will voluntarily become inmates. Home treatment under suitable conditions and medical supervision should be allowed—much on the plan which has proved so successful in Norway.

P. S. Abraham.

Denney (Oswald E.). **A Statistical Study of Leprosy in the Philippine Islands from the Histories of Ten Thousand Cases isolated in the Culion Leper Colony.**—*Jl. Amer. Med. Assoc.* 1917. Dec. 29. Vol. 69. No. 26. pp. 2171–2174.

Individual records of some 10,425 lepers have been kept at the Culion Leper Colony in the hope that facts of interest and of possible bearing on the transmission of leprosy might be obtained. The results are interesting, although, as the author observes, no facts have been found which furnish conclusive evidence as to the transmission of the disease. Table I gives the age at which infection is assumed to have taken place—or rather the time at which the first symptom was recognised :—

Ages 1 to 5 years	0·72 per cent.
„ 6 „ 15 „	24·30 „ „
„ 16 „ 35 „	50·87 „ „
„ 36 and over	24·10 „ „

About half the cases at Culion have been diagnosed in adolescence. These figures are remarkably similar to the statistics published by McCoy in the Hawaiian Islands in 1914 [see this *Bulletin*, Vol. 6, p. 115].

Table II gives the distribution of leprosy among members of families. Twenty-nine per cent. have given a definite history of previous contact with at least one leper relative. Nearly two-thirds of the cases were between relatives of like sexes. Thirty-five per cent. of the cases giving histories of contact with a single leper relative were sisters and brothers, 27 were cousins, 11 per cent. leper children and 7 per cent. leper parents. Tables III to VII illustrate these points.

Thirty-four per cent. of these cases were married before admission: of these only 1 per cent. were both infected. 66 7 of the patients at Culion were males.

The average duration of the disease has been 7·3 years. Mortality among children born of leper parents is high: 10·4 per cent. of those living in the colony have become infected with the disease, and of those born of parents one of whom is a leper and living among lepers for from 7 to 10 years 44 per cent. Only 2 employees of the colony have become infected—one a Caucasian ecclesiastic after 5 years' residence, the other a Filipino who came from an infected family and exhibited the symptoms in one year. The average number of non-leprous employees in the colony is 200—30 of whom have been there for 10 years.

Several other points of interest are discussed in this important paper, e.g., the food question, transmission by insects, climate, &c., to which the author attaches no etiological importance.

P. S. A.

GOODHUE (E. S.). **The Molokai Leper Settlement.**—*Med. Record.* 1917. Oct. 13. Vol. 92. No. 15. (Whole No. 2449.) pp. 629–632. With 5 figs.

In this short paper, Dr. E. S. Goodhue gives a very interesting and sympathetic illustrated account of the Molokai Leper Settlement. The successful labours of Mr. McVEIGH, the lay superintendent, and of Dr. Will GOODHUE, the medical superintendent, are specially alluded to in reference to the comfort and happiness of the afflicted residents; and it is interesting to know that cases are still being discharged as cured. Dr. W. GOODHUE's excellent operative results have already been alluded to in this *Bulletin.* As the author observes, there is probably no place in the world, no other leper colony, so advantageously placed by nature, more tactfully or scientifically maintained or so carefully and conscientiously provided for. "It is an evolution through a series of experiences and processes, to be sure, and credit is due to many men, boards, and legislatures; but it must be conceded that the best ameliorative measures are of comparatively recent date, and are due to the initiative of two or three men."

P. S. A.

LIE (H. P.). **Einiges von der Uebertragbarkeit der Lepra, insbesondere ihrer makulo-anästhetischen Form.** [The Transmissibility of Leprosy, especially the Maculo-Anaesthetic Form.]—*Dermat. Woch.* 1918. Jan. 5. Vol. 66. No. 1. pp. 1–14.

Dr. Lie is a strong advocate of the contagion theory of leprosy, and in this paper brings forward several points which in his opinion confirm his view. He refers to instances where a leprosy-free district has developed the disease subsequent to the advent of a leper, and gives a short account of a number of cases which he considers must have arisen through contagion. He emphasises the fact that an absolutely definite proof is impossible in these cases, considering the prolonged latency and incubation period of the disease. He contests the idea that leprosy does not pass from man to wife: Dr. SAND's statistics gave 3·32 per cent. of such instances, and his own observations give nearly 6 per cent.—a figure much higher than that among patients with tuberculosis—a malady admittedly of greater infective activity—viz , 3 per cent.

He maintains that there is always a danger of contagion even from the maculo-anaesthetic cases—seeing that bacilli have frequently been demonstrated in the superficial lesions of such patients. Several other points bearing on the subject are ably discussed in this paper.

P. S. A.

McCoy (G. W.). **The Diagnosis of Leprosy from a Public Health Standpoint.**—*New Orleans Med. & Surg. Jl.* 1917. Oct. Vol. 70. No. 4. pp. 364–369.

Dr. McCoy emphasises the importance of a correct diagnosis in cases of leprosy; for if an error is made serious results may ensue to the individual who is deprived of his liberty, as well as to the community who have to support him. The problem moreover differs from that of other contagious diseases inasmuch as there is much difference of opinion among authorities as to whether all cases need isolation. He compares leprosy with tuberculosis and plague in which only certain types—pulmonary cases of tubercle with open lesions and pneumonic plague—are regarded as a menace to others. The opinions of several leprologists are quoted who consider that nerve leprosy cases are not infective to others.

The diagnosis of leprosy is not always easy. Even if acid-fasts are found in a nasal smear caution must be exercised; the bacilli of avian tuberculosis and other acid-fasts may be present. Cases are mentioned in which such errors in diagnosis have been made. A positive diagnosis may often have to be deferred for months until the typical and undoubted acid fasts can be demonstrated. Serological tests can only be regarded as corroborative. If a patient gives a positive Wassermann as well as complement deflection with old tuberculin as antigen, the evidence for leprosy is strong.

In the author's view, cases in which leprosy bacilli cannot be found are not dangerous from a public health point of view; and even if a patient has been previously positive both clinically and microscopically he might be released if found negative by the microscope. There are a few cases in which, in spite of every examination, it is impossible to make a certain diagnosis; the author would then give the patient, and not the public, the benefit of the doubt. In non endemic foci a missed case does no harm, and in endemic foci an additional doubtful case will be of no material consequence.

P. S. A.

Palk (C. Leet) & **Bryson** (R.). **Early Diagnosis of Leprosy.** *Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 316–317.

In 1915 Major Neve discovered by radiography changes in the bones in an early case of leprosy. To see whether skiagrams would be of use in detecting early or suspicious cases, the authors examined 63 lepers in the Madras leper hospital -their ages ranging from 7 to 60 years. Of 12 early nodular cases, 4 exhibited changes and 8 were negative; 12 advanced nodular cases were all positive. In 15 early anaesthetic cases, 14 were negative and 1 positive; in 12 advanced anaesthetic cases, 10 were negative. Six early mixed cases were all negative, and of 6 advanced mixed cases 4 were positive.

The percentage in all 63 cases was:

Early, 84 8 negative and 15·1 positive.
Advanced, 13·3 negative and 86·6 positive.

These results show that leprosy cannot in any form be diagnosed with certainty in its early stages by X-ray examination of the bones of the extremities.

Nasal smears from all these 63 cases were examined for bacilli: 77 per cent. were positive and 22 per cent. negative. The authors question whether sufficient importance is attached to the possibility of leprosy being an air-borne disease - affecting the Schneiderian membrane in an early stage.

Six servants who had been attending on lepers in the hospital for periods ranging from 13 to 36 years were negative both as regards X-rays and nasal bacilli.

P. S. A.

Kraus (Rudolf). **Ungelöste Probleme der Lepra-Forschung.** [Unsolved Problems in Leprosy.] *Wien. Klin. Woch.* 1917. Oct. 4. Vol. 30. No. 40. pp. 1253–1256.

This paper purports to be a resumé of the present state of knowledge in connection with leprosy. The author observes that there are many problems which must be regarded as still unsolved: viz. (1) the cultivation of the bacillus; (2) its inoculability in animals; (3) the means of its communication from man to man; (4) the biological diagnosis of leprosy; (5) its etiology; (6) prophylaxis; and (7) specific treatment. He discusses recent work under each of these heads.

Importance is attached to Uhlenhut and Steffenhagen's granules found, by using "antiformin," in the lepra bacilli from nasal mucous membrane, and to Kedrowski's cultivations and inoculations —although the author does not consider the matter proved. He suggests that more than one microbe may be causal.

P. S. A.

de Buen (Sadi). **Estudios sobre la lepra en España.** [Studies on Leprosy in Spain.]—*Bol. Inst. Nac. Higiene de Alfonso XIII.* 1917. Dec.

In this paper the author continues his studies on leprosy in Spain. In tubercular leprosy (11 cases) he finds that the Wassermann reaction is always positive, while in the anaesthetic form (3 cases) it was negative in 2 out of 3. In 10 cases of mixed type it was positive in 6 out of 10. Treatment with chaulmoogra oil does not affect the result. Of 25 bugs that were examined after biting leper patients, only one was found to contain leprosy bacilli in the intestine. On the other hand, out of 50 flies, captured while feeding on the ulcerated surfaces of open sores, 28 were found to contain leprosy bacilli, i.e., more than half.

J. B. Nias.

MacCallum (W. G.). **Leprosy.**—*Proc. New York Path. Soc.* 1916. Vol. 16. p. 185.

At a meeting of the New York Pathological Society, Dr. MacCallum exhibited slides illustrating forms of leprosy seen in Fiji, Java, Bali, Singapore and Kuala Lumpur, and described the microscopical characters of lesions from two autopsies at Singapore. He laid especial stress on the great amount of fat globules in the large vacuolated bacilli-bearing cells as well as in the other cells found in the leprous tissue. This is well shown by staining with "Sudan"—giving a bright red colour to the tissue. He believes that this abundance of fat globules in the leprous cells has not been recognised, and suggests that the fat may have some protective relation to the bacilli.

P. S. A.

Climenko (Hyman). **Syringomyelia and Leprous Neuritis.**—*New York Med. Jl.* 1917. Sept. 29. Vol. 106. No. 13. (Whole No. 2026.) pp. 596–598. With 2 figs.

This paper records a case illustrating the difficulty of establishing a diagnosis where many symptoms of both leprosy and syringomyelia are present. A man aged 58, born in Minnesota, had some form of infection of the arms 33 years ago, since when the symptoms had gradually developed. For the last 3 years he had defective speech and dysphagia. Romberg, spastic and ataxic gait, head bent forward with limited movement, lordosis at the mid-dorsal spine, atrophy of the sternocleidomastoid muscles, nystagmus and anaesthesia over back of phalanges and palms of hands and over front of thighs, legs and feet, were all present. Heat and cold could not be distinguished on the upper extremity, and the feet. There was some senile atrophy of the skin on the left side of the face, a small leucodermic patch on the neck, and patches of pigmentation on the hands. On the chest was a dark red maculo-papular eruption. The right shoulder was fixed. The fingers of both hands were greatly deformed, atrophy of the thenar muscles, but not of the interossei. The phalanges were permanently flexed and paw-like, with trophic changes in the nails and scaliness of the skin. A Wassermann reaction was negative, and examination of the nasal secretion for leprosy bacilli was negative.

The author considers that while the onset of the disease, the frequent attacks of fever, the tuberculous eruption of the chest, paralysis of right facial nerve, point to leprosy, the nystagmus, difficulty in swallowing, husky voice, impotence, negative Wassermann and absence of nasal lepra bacilli speak for syringomyelia, with unusual type of deformity resulting in paw hand.

P. S. A.

HOFFMANN (Erich). **Tuberkuloseähnliche Gewebsveränderungen bei Syphilis, Lepra und Sporotrichose.** [Tissue Changes resembling Tuberculosis in Syphilis, Leprosy and Sporotrichosis.]—*Deut. Med. Woch.* 1917. June 28. Vol. 43. No. 26. pp. 806–808.

The histological examinations of the author show that the characteristic appearances of the tuberculous nodule or "tubercle" may be simulated in the nodular growths of leprosy, lupoid syphilis, experimental sporotrichosis, and other mycotic diseases—thereby confirming the views of F. LEWANDOWSKY, JADASSOHN and others. In these cases the lupoid structure may be due to the comparative paucity of bacilli or the weak virulence of the virus.

P. S. A.

GOTTHEIL. **Lepra tuberosa et mutilans.**—*Jl. Cutan. Dis. Including Syph.* 1917. Apr. Vol. 35. No. 4. (Whole No. 415) pp. 267–268.

The patient a female aged 54, Russian, was shown at the Manhattan Dermatological Society. She had been affected for 15 years and had been practically blind for 10 years. She came to America 8 years ago passing the immigration office inspection without trouble, although blind and with nodular lesions on the face, &c. It was an extensive case of the ordinary nodular type, with ulceration of the joints of the fingers, clawing of hands and feet, &c.

P. S. A. .

PERNET (G.). **A Case of Lepra.**—*West London Med. Jl.* 1917. Vol. 22. p. 133.

The lesions started late in 1916—two years after leaving the Gold Coast, where the patient had lived off and on for 15 years. In 1915 he contracted syphilis, treated with salvarsan and mercury by Dr. DOBSON. The Wassermann reaction was negative. The first lesion was a small round spot on the cheek gradually enlarging, then a ring like eruption on the left elbow showing anaesthesia and dissociation of sensation—other patches subsequently appearing. No information is given as to the presence of bacilli.

P. S. A.

CLEVES VARGAS (Carlos J.). **Formas curables de lepra.** [Curable Forms of Leprosy.]—*Repertorio de Med. y Cirug.* 1917. July. Vol. 8. No. 10. (No. 94.) pp. 458–465.

Remarks on the possibility of curing leprosy when taken early, with notes of the case of a man, aged 55, who had shown symptoms of macular leprosy for 5 years. He was taken into the leper hospital of Agua de Dios, in April 1914, and subjected to a systematic course of treatment, consisting principally in the use of chaulmoogra oil and hot baths. At the end of three years, in April of the present year, he was subjected to a careful scrutiny by the four physicians attached to the hospital with a view to his discharge, and was pronounced completely cured.

J. B N

MEIER FLÉGEL (E.). **Informe que presenta a la Academia Nacional de Medicina el doctor E. Meier Flégel sobre el tratamiento de la lepra.** [Report on the Treatment of Leprosy in Cuba.]—*Gac. Med. de Caracas.* 1917. June 15. Vol. 24. No. 11. pp. 94–96.

The author, having returned from Havana, reports on the treatment of leprosy employed in the leper hospital there, as follows :—

1. Reliance is principally placed on the use of Chaulmoogra oil, in the dose of 100 to 200 drops per diem.

2. Hot baths of decoction of red mango every night, with soaping with sulphur-soap.

3. Nasal douches three times daily with oxygen water.

4. A tumblerful of a 3 per cent. decoction of red mango three times daily.

5. The use as a beverage during the day of a decoction of sarsaparilla, Triticum repens, and a Cuban species of Polypodium (Doradilla). This is thought to aid the digestion of the Chaulmoogra oil.

Hypodermic injections of Chaulmoogra oil have been found painful, and have been largely given up. Intravenous injection of the oil has been tried by Dr. VAHRAM, in a dose of 0·00002 gramme per kilo of body weight, that is to say in the twentieth part of the toxic dose [see this *Bulletin*, Vol. 8, p. 247]. The oil is triturated with gum arabic to form an emulsion, and then sterilized, the initial volume of emulsion for a dose being 1 cc., raised gradually by one-tenth cc. to a maximum of 2 cc. This dose is maintained to the 20th injection, and the intravenous is then exchanged for the hypodermic method, by which the quantity of emulsion given can be gradually raised to 5 cc. The author does not say for how long this method of treatment is to be continued. In general the successful cure of a case of leprosy at Havana takes three years.

J. B. N.

ROGERS (Leonard). **Two Years Experience of Sodium Gynocardate and Chaulmoograte Subcutaneously and Intravenously in the Treatment of Leprosy.**—*Indian Jl. Med. Res.* 1917. Oct. Vol. 5. No. 2. pp. 277–300. With 6 plates.

The author here gives a summary of his work in this connection commenced in 1915. At first he employed the gynocardate orally and subcutaneously, but during the last 14 months chiefly by intravenous injections—with most encouraging results and no ill effects beyond temporary giddiness, headache and occasional localized clotting. He has found the sodium salts of the higher melting point acids of chaulmoogra distinctly more efficient than those reported on in his previous communications.

He gives in this paper brief notes of all the cases, 26, which he has treated for 3 months or more, and tabulates the results.

His conclusions are :—

"1. A year's further experience has confirmed my observation that intravenous injections of the sodium salts of the fatty acids of chaulmoogra oil obtained from the seeds of *Taraxtogenos Kurzii* produce reactions in leprous tissues with breaking down of the acid-fast bacilli, which reactions are followed by great improvement.

"2. The higher melting point acids, which furnish sufficiently soluble salts (melting points of from 49° to 62° C.) are considerably more active than the lower 37° C. melting point acids first used by me for injection.

"3. Subcutaneous injections do not produce reactions in the leprous tissues and are less effective than intravenous ones.

"4. Prolonged oral administration in quantities of 20 grains and upwards daily has a good effect, especially if intravenous injections have previously been given and also in conjunction with them.

"5. Between 1 and 2 years were required to cause the lesions to disappear in the successful cases, but this period may possibly be reduced by the use of the more active higher melting point preparations, which have only been under trial for the last 6 months.

"6. The lesions have disappeared in 50 per cent. of cases treated within 3 years of the onset of the disease, including cases treated for only 3 to 12 months, but in cases of from 3 to 15 years' duration, only 25 per cent. cleared up under the treatment.

"7. The most active constituent of the oil has not yet been obtained in a pure state; so further investigation on the same lines may possibly yield still better results in the near future."

The paper gives details as to dosage and technique of the injections, and is copiously illustrated with photographs and drawings.

P. S. A.

SPITTEL (R. L.). **Sodium Gynocardate in Leprosy.** [Correspondence.] —*Indian Med. Gaz.* 1918. Jan. Vol. 53. No. 1. p. 33.

Mr. Spittel, Surgeon, General Hospital, Colombo, has not had encouraging results with intravenous injections of gynocardates. It had occurred to him before Sir L. ROGERS' paper was published to inject a soap made with the fatty acids of chaulmoogra, and a solution was prepared at the Government Laboratory. It was not satisfactory, and he, therefore, tried ROGERS' preparation a 2 per cent. stock solution in doses of 1 to 10 cc. The reactions were always more or less severe even in small doses, but in no case after a course of several months did benefit result. The patients suffered from chills, fever, headache, pains all over the body, vomiting etc. Gastritis was frequent and distressing.

P. S. A.

STÉVENEL (L.). **Essais de traitement de la lèpre par des *injections intraveineuses d'émulsion d'huile de Chaulmoogra.*** —*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 684–687.

In consequence of the well known drawbacks to the internal and intramuscular administration of chaulmoogra oil, the author in conjunction with Dr. NOC prepared a very fine emulsion in 1911, which was tentatively tried intravenously in animals and in a case of leprosy with encouraging results in Martinique. It contained 5 cc. of the oil in 150 cc. of "physiological serum." One cc. of an emulsion containing 2 cc. of the oil in 5 cc. of distilled water proved fatal in a rabbit. The original weaker emulsion was employed in cases of leprosy in 5 cc. doses intramuscularly, subcutaneously and also by the mouth in doses of 2 teaspoonsful daily. In 1916 an improved emulsion was prepared at the Institute of Hygiene in Martinique, containing 5 cc. of the oil emulsified in 150 cc. distilled water with normal soda solution. The oil is vigorously agitated with the soda solution drop by drop, and when of creamy consistence poured into the distilled water, the flask violently shaken and further drops of normal soda solution added until slight alkalinity is produced and emulsification complete. A drop should be examined by the microscope and large globules filtered off if present. The emulsion should then be sterilised at 110° C. and kept in sealed tubes. This emulsion has been used intravenously in 2 cases with good results; nodules have disappeared, sensibility was restored. After each injection congestion of the nodules and temporary pain have occurred indicating a selective effect on the leprous lesions. In 1911 Dr. Noc and the author had observed changes *in vitro* in the lepra bacilli which, after contact with the emulsion, lost in part their acid resisting property.

P. S. A.

COGHILL (H. Sinclair). **Some Results obtained by Heiser's Treatment of Leprosy in Nigeria.**—*Ann. Trop. Med. & Parasit.* 1917. Aug. 23. Vol. 11. No. 2. pp. 205–210. With 2 plates.

This paper is a preliminary record of the results of treatment by HEISER'S method in a number of cases of nodular and nerve leprosy at the Yaba Leper Asylum, Nigeria. The treatment was begun in May 1916 and continued until the following December. As the author observes, the time is too short for a complete report. All the cases were old-standing, and some had been in the Asylum for 11 or 12 years. They all responded more or less to the treatment: ulcers healing, nodules softening and becoming absorbed, maculae fading, and sensation returning. The details of 7 cases are given. The initial intramuscular dose was 2 cc. increasing by 1 cc. until finally 6 cc. were injected twice a week and well tolerated. Guaicol carbonate in 5 grain doses was useful in controlling febrile disturbance.

P. S. A.

SORDELLI (Alfred) & FISCHER (Hermann). **Zur Frage der diagnostischen Serumreaktion bei Lepra.** [Diagnostic Serum Reactions in Leprosy.]—*Wien. Klin. Woch.* 1917. Oct. 4. Vol. 30. No. 40. pp. 1256–1258.

This is an account of serological experiments and observations for diagnosis in 81 cases of tuberous leprosy carried out in Dr. KRAUS'S Institute in Buenos Ayres. In 43 cases the Wassermann reaction was strongly positive, in 25 negative, in 12 positive and 1 neutral. The Klinger-Hirsch and tuberculin reactions were also employed, and the results tabulated.

A positive "Wassermann," negative "Klinger-Hirsch" and positive "tuberculin" indicate leprosy: a positive Wassermann, positive Klinger-Hirsch and negative tuberculin indicate syphilis; and a positive result with all these reactions indicates leprosy combined with syphilis.

P. S. A.

CZAPLEWSKI. **Albert Neisser und die Entdeckung des Leprabazillus.** [Neisser and the Discovery of the Leprosy Bacillus.]—*Arch. Dermat. u. Syph.* Orig. 1917. Sept. Vol. 124. No. 3. pp. 513–530.

In 1879 Dr. Albert NEISSER visited Norway in company with

Dr. Lesser for the purpose of studying leprosy. They were well received by Drs. Danielson and Armaner-Hansen, shown everything at Bergen, Molde and Trondhjem, and allowed to take away abundant material for microscopical examination.

The author claims that Neisser was the real discoverer of the bacillus, and that he always felt aggrieved that his original work in this connection had not been generally recognised. It is quite true that shortly after his return from Norway he lectured on the aetiology of leprosy, and his paper was published in the "*Breslauer Ärztlicher Zeitschrift*, 1879, Oct. 25 & Nov. 7." He therein recorded his elaborate observations on the bacilli, which he was the first to demonstrate by Weigart's staining methods -finding that they stained best with fuchsine and gentian violet. He proved their extraordinary abundance in the skin lesions and their presence in many of the internal organs, clearly described their morphological character, their formation in 'globi,' and expressed his belief in their etiological significance that the bacilli were the real cause of the disease. In this paper Neisser alludes to the earlier observations by Hansen and others, and as far as the reviewer can gather only claimed to have surely demonstrated by staining their constant existence in leprous tissues and their importance as an etiological factor. It is noteworthy that these observations were made and published before Robert Koch discovered and showed how to stain the bacillus of the tubercle.

Until Neisser's work on the subject, the bacilli had certainly not been completely demonstrated, but there is no doubt that Hansen many years previously and before the staining methods were known had observed the typical microorganisms, and published his observations in Norwegian, in the *Norsk Mag. f. Laegevidenskaben*, Kristiania, 1874. In 1880, Hansen further published in *Virchow's Archiv*, Bd. 79, a full account of his work and former observations and experiments with drawings of the bacillus. Hansen, indeed, is universally, and in the reviewer's opinion, rightly considered to be the original discoverer of the bacillus of leprosy.

The author of the paper under review maintains that Hansen has got the credit in consequence of the greater publicity of his paper in *Virchow's Archiv*, and that Neisser's work has been ignored. This is not quite correct: in the reviewer's article on leprosy in *Allbutt's System of Medicine*, 1st Ed., 1897, it is stated that "Neisser- employing the new aniline dyes, placed Hansen's discovery beyond doubt." Neisser's important work in connection with leprosy, &c. was recognised by his being the recipient of the Gold Medal of the West London Medico-Chirurgical Society in 1911.

This paper is a characteristic German attempt to claim for Germany every important discovery in Science!

P. S. A.

TUBERCULOSIS IN NATIVE RACES.

WANLESS (W. J.). **Tuberculosis in India. Some Suggestions on its Spread and Prevention.**—*Proc. Third All-India Sanit. Conference.* 1914. Vol. 3. Supplement to *Indian Jl. Med. Res.* pp. 38–41.

The author, who is President of the Medical Missionary Association of India, expresses the opinion that there has been of recent years an increase in the amount of tuberculosis in India. He says :—

"The famine of 1900 and the plague outbreaks of previous and subsequent years have left in their train a legacy of tuberculous diseases. In times of scarcity and famine, and in recent years, during outbreaks of plague in villages, large numbers of the labouring classes have been in the habit of migrating to Bombay in search of employment and immunity from plague. No inconsiderable number of these people, contracting tuberculosis in the overcrowded *chawls* of Bombay, have returned to their villages to spread the disease among their families and neighbours. Again and again the writer has come across such cases. The Christian cemetery at Miraj is largely populated by persons dying of tuberculosis, a large proportion of whom were children, students or teachers in Bombay schools sent there from the Deccan during the last famine, and others who had gone to Bombay in search of employment.

"That persons born and matured in the Deccan lose resistance against tuberculosis through residence in Bombay seems to be supported by experience. The possible greater infectivity of Bombay as compared with the Deccan would not entirely account for this increased development of tuberculosis. Most of these patients referred to were students or teachers who lived in better sanitary surroundings and had better food and care than they had previously been accustomed to in their up-country homes. Add to this lowered resistance induced by the Bombay climate, the unsanitary conditions of the *chawls* and boarding-places, it is not surprising then that Bombay has had unmistakeable influence in the spread of tuberculosis among the up-country villages, and the same statement can probably be made in reference to other overcrowded coast cities."

A series of recommendations is then put forward with the prevention of tuberculosis in view, of which the principal are—(1). The printing of tracts in the vernacular setting forth the nature of and means of combating tuberculosis. (2). Special training of assistant and sub-assistant surgeons in giving instruction as to the disease to school-teachers. (3). A requirement that all such assistant and sub-assistant surgeons should be competent to diagnose tubercle bacilli by the microscope, with provision of the necessary apparatus. (4). Periodical examination of all school-children suffering from cough. (5). More sanatoria. (6). A large central fund to be raised with this object in view, to which it is thought that rich natives would be very willing to contribute.

J. B. Nias.

COCHRANE (A. W. R.) & SPRAWSON (C. A.). i. **The Organization of Anti-Tuberculosis Measures in India.**—*Proc. Third All-India Sanit. Conference.* 1914. Vol. 3. Supplement to *Indian Jl. Med. Res.* pp. 42–50. With 3 text-figs.

ii. **Experience in Treatment of Pulmonary Tuberculosis in Indians by Tuberculin.**—*Ibid.* pp. 51-60.

Two brief papers expressing the opinions of the authors on the subjects indicated in the titles. The recommendations as to an anti-tuberculosis campaign in India are on much the usual lines. The importance of establishing tuberculosis dispensaries on an independent footing, after the Edinburgh model, is duly insisted on. The Tuberculosis Officer should occupy a relatively independent position with regard to the Medical Officer of Health, i.e., both should be separately responsible to a higher authority, while co-operating as regards their duties. The native habit with regard to expectoration, both in- and out-of-doors, should be effectively reformed. All school children should be inspected once a quarter at school for suspected phthisis, enlarged glands, bad teeth and so on, and the best person for such a task will be a nurse from the Tuberculosis Hospital, generally a European, whose pay should be not less than Rs.150 per month, with carriage hire. Like most other Indian observers, the authors remark that tuberculosis in India is more often propagated inside the native house than out of it.

The experience of the authors with tuberculin is limited to the small number of 55 cases in a sanatorium and 53 at a tuberculosis dispensary.

J. B. N.

WILKINSON (E.). **Notes on the Prevalence of Tuberculosis in India.**—*Proc. Roy. Soc. Med.* (Sect. Epidem. & State Med.). 1914. June. Vol. 7. No. 8. pp. 195–226.

In a paper read before the Section of Epidemiology and State Medicine of the Royal Society of Medicine, London, the author draws attention to the amount of tuberculosis in British India, as attested by recent observers. Satisfactory statistical returns for this purpose are difficult to obtain, because certification of the causes of death is impossible for the vast majority of the population, who either die without any medical attendance at all, or are attended by "practitioners of indigenous systems of medicine," as the author politely describes them. In the principal cities, however, during the last few years, enquiries have been instituted as to the causes of death by qualified medical men, and from these sources some reliable figures can be obtained as to the prevalence of tuberculosis amongst the general population. The following abridged table shows the proportion of deaths from phthisis during the last few years in the three great cities of Madras, Calcutta and Bombay.

Year.	Madras.		Calcutta.		Bombay.	
	Mortality per 1,000.		Mortality per 1,000.		Mortality per 1,000.	
	Phthisis.	All causes.	Phthisis.	All causes.	Phthisis.	All causes.
1905	1·6	24·2	2·4	38·0	3·27	61·54
1906	1·4	46·6	2·6	35·7	3·64	54·07
1907	1·2	40·5	2·6	37·6	2·94	39·56
1908	1·4	43·7	2·5	32·6	2·44	39·13
1909	1·2	37·9	2·3	34·1	2·45	35·66
1910	0·4	39·8	2·3	27·9	2·33	35·72
1911	0·4	42·0	2·3	27·2	2·12	35·69

Returns of deaths from the native army and the jails are vitiated by the invaliding of soldiers, and the liberation of prisoners, before death occurs. Returns from hospital and dispensaries are also vitiated from the varying qualifications of the native medical practitioners employed. A table (Statement III, p. 202) is given showing the hospital admission-rates of prisoners in jails, for tubercle of the lungs, in certain provinces of India, Burmah, and the Andamans, which exhibits an average, for the years between 1899 and 1911, ranging from 7·6 to 9·9 per 1,000. Whether there has been an actual increase in the prevalence of tuberculosis in India of recent years, or whether the increase is only apparent, due to the increased attention paid to the subject, is a question much discussed in India at the present time. The author suggests the following causes for a real increase.

1. The seasonal employment of country people in cotton and jute-mills and factories, with a subsequent return to the country.
2. Increased travelling of natives by train, with the habit of expectoration freely practised everywhere.
3. The extension of education and consequent multiplication of sedentary employments.

Attention has been paid of late to the question of bovine tuberculosis in India, but it has been found that on the whole bovine tuberculosis is decidedly rare in India among animals, and therefore it may be assumed that there is correspondingly little risk of this kind of infection in human beings. The danger is further diminished by the facts that large sections of the population, including all Hindus, refuse to eat beef, and that milk is almost invariably boiled before use; butter also being clarified by heating.

J. B. N.

LANKESTER (A.). **The Gland Index in Tuberculosis.**—*Indian Jl. Med. Res.* 1916. Oct. Vol. 4. No. 2. pp. 285–302.

The author of this paper discusses the question whether the gland index, i.e., palpation of the submaxillary and cervical glands in children, can be taken as a guide to the prevalence of tuberculosis in a community. Out of 9,128 school-children in India and Burmah, under 12 years of age, 2,692 or 29·49 per cent. showed enlargement of the glands, when examined as follows:—

> "The method employed in the enquiry was of the simplest description, the aim being rather to cover a large and inclusive area than to deal in a more intensive manner with a limited field. . . . No prolonged examination of individual cases was made; the children were placed in lines and examined in succession by the two hands, one on each side of the neck. The submaxillary and cervical regions alone were palpated, and all cases were marked as negative in which enlargement of the lymphatic glands was not instantly apparent. . . . .
>
> "It is not, however, suggested that all, or even the great majority, of the cases classed as positive are necessarily tubercular in character; the contention is that the proportion of such cases is sufficiently large as to give practical value to the percentage as an index of tuberculosis prevalence."

The above figure of 29·49 per cent. is compared with that obtained from 240,000 children belonging to the London School Board, examined in 1913, in whom the percentage was 10·5, while in 1914 it was 8·8. The correlation between the gland enlargement percentages and the tuberculosis death-rate in those centres where the figures for the latter were obtainable, was worked out for the author by Dr. T. G. WALKER, and the co-efficient obtained was ·91 ± ·03.

J. B. N.

i. DE LANGEN (C. D.) & SCHUT (J.). **Essays on Tuberculosis in Java.** [Also in Dutch.]—*Med. Burgerlijken Geneesk. d. in Nederl-Indië.* 1917. Vol. 2. pp. 1–2

ii. SCHUT (J.). **Immunity and Disposition for Tuberculosis among Savage Tribes and the Theory of the Virgin Soil.**—*Ibid.* pp. 3–29.

i. An introduction to a series of essays on tuberculosis in Java, of which the following is the first.

ii. The author discusses in general terms the asserted fatality of tuberculosis amongst the native races of the tropics, and is inclined to deny it. He regards von Pirquet's reaction as quite untrustworthy as an index of the presence of the disease in tropical races, and quotes authority for the statement. The greater part of the paper is devoted to controverting MUCH's hypothesis, that tuberculosis has become milder among Europeans and other inhabitants of the temperate zones, as the result of secular infection.

J. B. N.

PARROT (L.). **Infection tuberculeuse dans le Hodna Oriental (Steppe Constantinois).**—*Bull Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 860–863.

The author gives figures for the percentage of Arab and Berber children from 0–15 years of age, infected with tuberculosis, as determined by the cuti-reaction test, in the above district, for the year 1915–16, as follows—

Arab children in villages.

0–1 year	0 per cent.	39·6 per cent.
1–5 years	16·7 " "	
6–15 "	54·8 " "	

Ditto living in tents.

0–1 year	0 per cent.	30·5 per cent.
1–5 years	20·8 " "	
6–15 "	37·1 " "	

Berber children in villages.

0–1 year	0 per cent.	25·6 per cent.
1–5 years ..	11·9 " "	
6–15 " ..	48·2 " "	

Ditto in tents.

0–1 year	0 per cent.	24·3 per cent.
1–5 years ..	15·3 " "	
6–15 " ..	31·3 " "	

J. B. N.

Loiselet (M.). **La tuberculose humaine à Madagascar.**—*Rev. Méd. d'Hyg. Trop.* 1913. Vol. 10. pp. 193–201.

The author comments on the facility with which cases of tuberculosis are cured in Madagascar. This appears to be due to the mildness of the local strain of tubercle bacillus. Pulmonary excavation is seldom met with in cases of phthisis, and the bacillus, under the microscope, shows granular attenuated forms which to the expert eye easily differentiate it from the European variety. Injected into guinea-pigs, even into the peritoneum, the bacillus, instead of causing death within the usual interval, allows of a long and even indefinite survival. The artificial cultures are poor, even after 5 or 6 weeks. Treatment of cases with tuberculin is generally successful, and can be pushed with extraordinary rapidity, whatever the form of the disease. This attenuation seems to be a property of the local strain of tubercle bacillus, because it is equally benign both for the native and the European. Infection with the European bacillus, on the other hand, hits the native badly.

Notes are given of the cases of 10 patients, some Europeans and the rest natives, affected with phthisis, in which treatment with injections of creosoted oil (1 : 15), and Denys' tuberculin produced striking results.

J. B. N.

Barbosa (Placido). **O problema da tuberculose na cidade do Rio de Janeiro.** [The Problem of Tuberculosis in the City of Rio de Janeiro.]—*Brazil Medico.* 1917. July 28. Aug. 4 & 11. Vol. 31. Nos. 30, 31 & 32. pp. 251-253; 261–263; 269–271.

The author draws a dark picture of the state of the city and district of Rio de Janeiro as regards the prevalence of tuberculosis. The mortality is higher than that of 30 other large cities of the world which are named. Between 1863 and 1891, the mortality from tuberculosis declined from 12·2 to 5·4 per 1,000, but since that date it has remained comparatively stationary, the figures for the whole Federal District in 1915 being 4·61 per 1,000. In the city of Rio de Janeiro alone 3,500 persons die annually from tuberculosis, and it may therefore be estimated that from 8 to 10 times as many persons are suffering from that disease, according to the usual methods of calculation.

The author recommends a practical enforcement of all the usual precautions against tubercular infection which are found necessary elsewhere, namely, prohibition of expectoration in public places, notification, removal to hospital, domiciliary visiting, and improved housing of the working classes.

J. B. N.

Leger (Marcel). **La Tuberculose à la Guyane française.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 778–784.

The author finds that tuberculosis is taking a preponderating place in the nosology of French Guiana. Satisfactory statistics for the whole population are not to be had, as a very large number of deaths are uncertified as to cause. From the civil hospitals and the convict establishments, however, some information is to be gained, and it is of a disquieting character. The following figures are taken from a table given (Table I).

Hospital cases, exclusive of prisoners.

	Total number of deaths from all causes.	Deaths from tuberculosis.
1898–1902	65 ..	8 = 12 per cent.
1903–1907	48 ..	3 = 6·4 „ „
1908–1912	53 ..	1 = 2·0 „ „
1913–1917 (8 mos.)	49 ..	7 = 14 „ „

The number of cases of tuberculosis admitted to hospital from the penal establishments for the last 8 years was as follows: –

1909	27	1913	36
1910	17	1914	57
1911	32	1915	39
1912	34	1916	40

In the Cayenne Civil Hospital tuberculosis heads the list of causes of death.

J. B. N.

SLOAN (Martin F.). **The Urgent Need of Hospital Facilities for Tuberculous Negroes.**—*Southern Med. Jl.* 1917. Aug. Vol. 10. No. 8. pp. 651–657.

According to the author, negroes form 29·8 per cent. of the population of the Southern United States, and are three times as much affected by tuberculosis as whites. Nevertheless, out of 4,130 beds in different sanatoria, only 114, or 3 per cent., are alloted to negroes. The number of negroes suffering from tuberculosis is probably much greater than that officially registered, and practically all who die, die at their homes, so as to infect the maximum number of contacts. The Federal Census of 1910 showed 9,827,763 negroes in the United States, of whom 8,746,709, or 89 per cent., were in the Southern States. In numerous trades and domestic occupations the negro comes into the closest contact with the white man; therefore manifestly there is here a very urgent problem to be solved from every point of view. The prejudices of the negro make it very difficult to get him into a sanatorium, and when there, care must be taken to interest and to occupy him. Also, every effort should be made to instruct such patients in the hygiene appertaining to tuberculosis. The stay in the sanatorium should be for at least 6 months. In the discussion which followed, in which several medical experts took part, the necessity for home-visiting, in addition to sanatorium treatment, was strongly insisted on.

J. B. N.

PROTOZOOLOGY.

Fantham (H. B.). Some Parasitic Protozoa of Man, and their Probable Evolution.—*Med. Jl. S. Africa.* 1917. Oct. Vol. 13. No. 3. pp. 33–48. With 37 text-figs.

In this paper Fantham gives a general account of most of the Protozoa which are of special interest to those engaged in the practice of medicine. It is a clear account and has sufficient detail to render it of practical value. Considerable stress is laid on the process of adaptation to a parasitic life in man of the protozoal forms which exist either free in nature or already parasitic in lower animals. More space is devoted to the Mastigophora than to the other classes of the Protozoa; a section is devoted to the spirochaetes. In the course of his paper the author draws attention with particular emphasis to that aspect of his subject which is of the greatest interest to medical men, namely the view that a proper and efficient prophylaxis against protozoal disease can be established only when, by a thorough study of the life history of the various protozoa, their habits, localities and means of transmission are understood and appreciated. The paper does not contain much that is new, but it is up to date and for those who are beginning the study of the pathogenic protozoa it will afford a useful insight into the subject.

B. Blacklock.

Kuenen (W. A.) & Swellengrebel (N. H.). **Korte beschrijving van enkele minder bekende protozoën uit den menschelijken darm.** [Short Account of Some Less Known Protozoa from the Human Intestine.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 4. pp. 496–506. With 1 plate.

Under the name *Entamoeba tenuis* the authors give a description of what they consider to be a new species. It measures 6–9μ in diameter with cysts 6–8μ in diameter. The cysts are one to four nucleated; none with a larger number than four nuclei was found. In a footnote the authors say it is possibly the *E. minuta* of Woodcock and Penfold, but state that this latter name is already taken as a synonym of *E. histolytica.*

Chilomastix mesnili is described in the next section and in reference to its cysts attention is drawn to the resemblance between some of these and the cysts of *E. tenuis.* Limax amoebae were found and are classified under three types, *Limax, Endolimax intestinalis* and *Pseudolimax.* A section on Blastocystis concludes the paper. Of Blastocystis the authors say it is a product of necrobiosis in certain cells but what cells, whether epithelial or parasite or both, they do not debate here.

B. B.

Leger (Marcel). **Parasites sanguicoles d'Oiseaux de la Guyane.**—*Bull. Soc. Path. Exot.* 1918. Feb. Vol. 11. No. 2. pp. 124–130.

The author compares the incidence of Haematozoa in birds in Tonkin, French Sudan, France and Guiana. He has failed to find

Leucocytozoa in birds in the last named region although he has examined more than 500 specimens belonging to 78 different species and 27 families; he gives a list of the families. The negative results obtained by BRIMONT in the same region, by CARINI and collaborators in Brazil and ITURBE and GONZALES in Venezuela are mentioned. The parasites found in the blood of the birds examined are described under four headings:—Trypanosomes, Haemoproteus, Microfilaria and Spirochaetes.

In *Nyctanassa violacea*, a bird of the family Ardeidae, a trypanosome was found in 6 out of 10 individuals. It is the same trypanosome as that found in Tonkin by MATHIS and LEGER in *Ardella Sinensis*, and as that found in *Ardea atricapilla* in Senegal by A. and M. LEGER. This trypanosome is found therefore in Asia, Africa and America in species of the same family. The author proposes on this account to call it *Trypanosoma ardeae*. He gives a description of this parasite. and of similar ones found in *Ardea caerulescens* and *Butorides striata*. Under the heading Haemoproteus he gives the following hosts, *Falco sparverius*, *Anas moschata*, *Tringa atricapilla*, domestic pigeon, *Columba rufina* and *Scops brasiliana*.

Spirochaeta gallinarum was found in fowls, and was the cause of considerable mortality. *Argas miniatus* was present in most of the fowl houses in large numbers.

B. B.

COMMES (Ch.). **Leucocytozoon et Microfilaire d'un rapace diurne** (*Astur badius*, **var.** *sphenurus*).—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 31–34.

The author found in the blood of this bird at Bamako a leucocytozoon and a microfilaria of which he gives a short description. Microgametes and macrogametes of the leucocytozoon appeared in the peripheral blood, the former measuring 21 by 5·5μ, the latter 23 by 7μ. Lung smears revealed the young forms of the parasite in large numbers and here all forms stained better than those found in the peripheral blood. The leucocytozoon corresponds to type F of the classification of MATHIS and LEGER. Efforts at producing infection by inoculation were negative. The author names it *L. Martyi*. The microfilaria, which was unsheathed, measured about 90μ long by 4·2μ broad. No adult filariae were found at autopsy. The name given to it is *Microfilaria bernardi*.

B. B.

JOHNSTON (J. E. L.). **On some Peculiar Bodies found in the Blood of Certain African Snakes.**—*Jl. Trop. Med. & Hyg.* 1917. Nov. 1. Vol. 20. No. 21. pp. 241–242. With 2 plates.

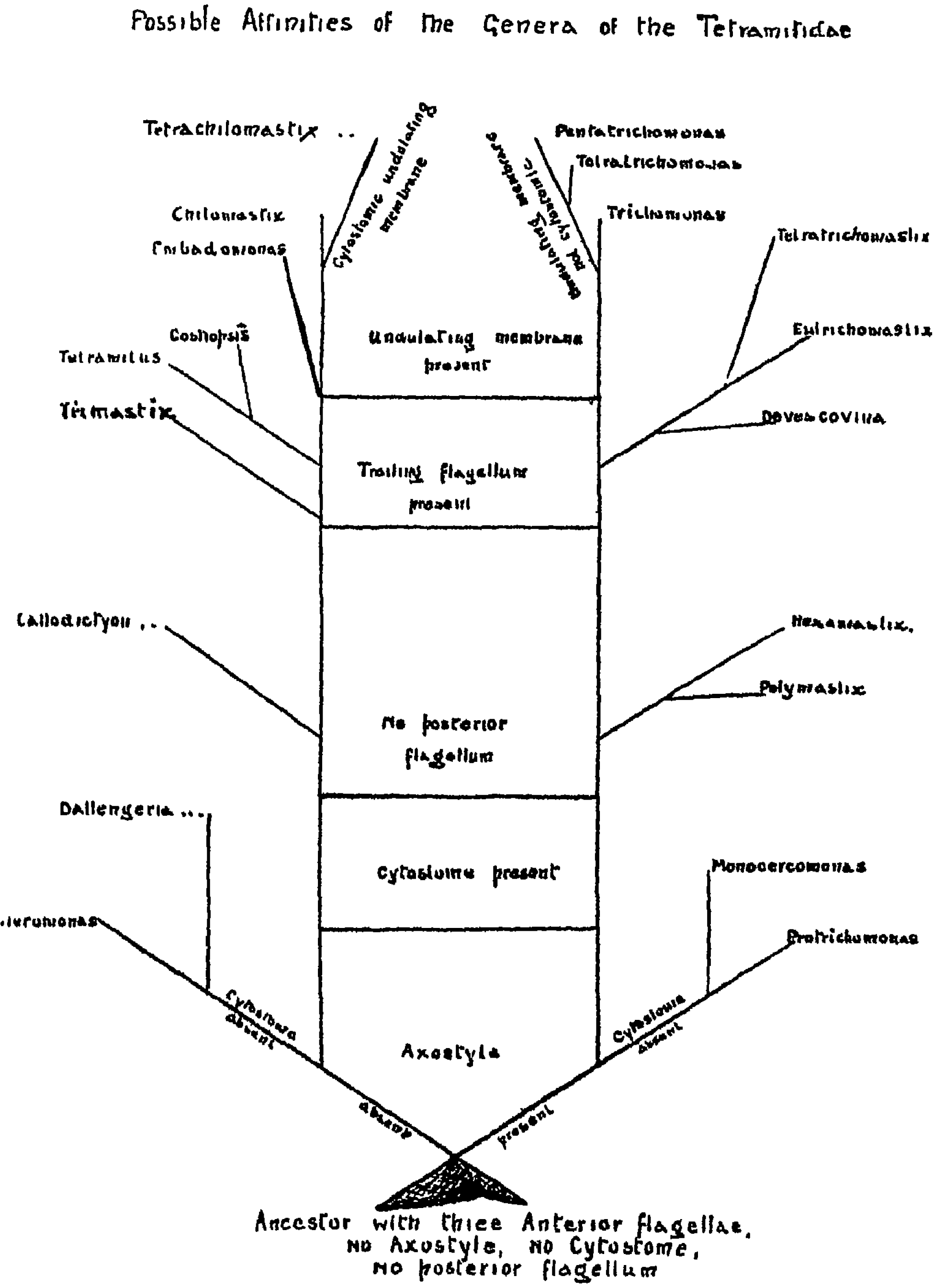
In the heart blood of seven out of twenty snakes examined in Nigeria bodies were found in the erythrocytes. The cells concerned stain poorly, the changes affecting the nucleus and being apparently of a degenerative character. The bodies, the parasitic nature of which is considered probable by the author, although he considers it not definitely proved, are small and of two kinds, one of which stains blue and the other red. They exhibit considerable variation in size.

The author suggests they may be a new parasite, or a stage in the development of a parasite already known, such as a haemogregarine.

B. B.

Chalmers (Albert J.) & Pekkola (Wäinö). *Chilomastix mesnili* (**Wenyon 1910**).—*Ann. Trop. Med. & Parasit.* 1918. Jan. 31. Vol. 11. No. 3. pp. 213–264. With 2 plates.

This paper should prove of great value to those who are engaged in the study of members of the family Tetramitidae. The authors' somewhat apologetic reference to the limited resources in literature to which they had access seems hardly necessary in view of the great amount of work they have accomplished.



[Reproduced by permission from the *Transactions of the Society of Tropical Medicine and Hygiene.* 1917. Dec. Vol. 11. No. 2. p. 101 (where this diagram was published on a reduced scale).]

The genus *Chilomastix* Alexeieff 1911 is dealt with historically and the species *C. mesnili* Wenyon is traced in the literature so far back as DAVAINE's *Traité des Entozoaires* published in 1860, in which in the authors' opinion it appears as one of two varieties of *Cercomonas hominis.* The authors give a very full account of the work of WENYON on this parasite and of the various synonyms. The geographical and zoological distribution are briefly stated and the authors go on to give a description of the living parasite, its morphology and development.

In their section on Classification the authors give diagnostic tables of the Mastigophora, Euflagellata, Protomonadina, and Monozoa, and the consideration of the family Tetramitidae follows, in the course of which the authors give a brief account of each of thirty-four genera. Of these they discard all but nineteen which they define.

The sections which follow are concerned with affinities, subfamilies, the Tetramitidinae, the genus *Chilomastix* and *Chilomastix* species, and *Chilomastix mesnili*, its pathogenicity, and treatment. The paper is illustrated by photomicrographs. A diagram illustrating the authors' views of the possible phylogenetic relationship of the genera is reproduced here, and may be used also in connection with their paper on Enteromonas [see below].

B. B.

SWELLENGREBEL (N. H.). **Ueber die Cystenbildung des *Chilomastix mesnili* Wenyon.** [Cyst Formation of *C. mesnili.*]—*Arch. f. Protistenk.* 1917. Vol. 38. No. 1. pp. 89-93. With 2 plates & 1 text-fig.

The author studied three cases of infection with *C. mesnili* at one time and two others subsequently. From the varied appearance of the organisms in the cases, he considers it possible that such subgenera as Fanapepea and Difaemus may have little validity.

The process of encystment has not, in the author's opinion, as yet been completely described and he proceeds to describe it. Case number one was a pure infection with *C. mesnili.* He found pear shaped forms, oval forms and small round forms, the latter provided with a definite cyst wall. Case two had also infection with *E. histolytica* and Blastocystis. The rounding of the parasites was repeatedly observed in this case, the resulting form being devoid of flagella and having alveolar protoplasm. Cyst forms containing one nucleus and two nuclei were found; finally also four-nucleate forms with chromidial bars. The author states that he could not determine with the material from this case whether these last forms belonged to *C. mesnili.* Case three had a mixed infection with *E. coli* and *Amoeba limax.* One two and four nucleated cysts were found with and without chromidial bars. The author observed that these forms corresponded with the forms from case two. He states "These four nucleated cysts show a superficial resemblance to cysts of *E. histolytica*, but are much smaller." [How much not stated.] Case four had active forms in the stool and the earliest stages of encystment could be followed because in this case the non-flagellated precystic stage was absent. He represents in a text figure a form of which he says "First of all there are in the cyst the three flagella, 3 basal granules, and the peristome fibril quite clear.".

B. B.

ARAGÃO (Henrique de Beaurepaire). **Pesquizas sobre o *Copromastix prowazeki* n.g., n.sp.** [Researches on *Copromastix prowazeki* n.g., n. sp.]—*Mem. Inst. Oswaldo Cruz.* 1916. Vol. 8. No. 2. pp. 64–67. With 1 plate.

The author describes the flagellate, which developed in faeces culture on two occasions. The first was on a medium composed of ·5 per cent. egg albumin, which was used for the culture of Nyctotherus in frog faeces, the second was in Ancylostoma faeces diluted, to which animal charcoal had been added. He discusses the question of parasitism in these cases and considers it probable that the organism is a free living form which was enabled to pass through the alimentary tract in an encysted condition.

The length averages 16 to 18μ and the breadth 7–9μ in fully developed forms. Smaller forms were 6μ by 3μ. The form of the body is elongated being broad in front and tapering posteriorly. The anterior border forms the base of the isosceles triangle to which the body of the protozoon is comparable. At one of the antero-lateral angles there is a buccal groove which extends to a third of the anterior border and a quarter of the lateral border. The mouth is a simple slit without any special organ. Four anterior equal flagella rise in a basal granule from the middle of the anterior border; a rhizostile is frequently seen running from the basal granules into the protoplasm, running near the nucleus. The author does not think this organism can be included in known genera and he creates the genus Copromastix with the name *C. prowazeki*. The diagnosis of the genus is Tetramitidae, with 4 equal and anterior flagella, with subtriangular body, with buccal groove, not provided with any organelle; not possessing either undulating membrane or axostyle.

B. B.

CHALMERS (Albert J.) & PEKKOLA (Wäinö). ***Enteromonas hominis* da Fonseca, 1915.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Dec. Vol. 11. No. 2. pp 93–103. With 1 plate.

After introductory matter the authors go on to consider Da Fonseca's original definition of the genus Enteromonas and his description of the species *E. hominis.* The authors have discovered this parasite in Khartoum in a woman usually resident near Assouan. The symptoms in this case were alternating periods of diarrhoea and constipation. No blood was passed but pain and straining occurred. The motions were about six daily during the attacks which generally lasted ten to fifteen days. The flagellates were present at all times during the period of observation, but were scanty except during the diarrhoea period when they occurred in enormous numbers. A description of the parasite in the living state and when fixed and stained is given. Points in the morphology are the following. The parasite has three types, oval, rounded and irregular, which vary in size from 5·5 by 4μ for the oval form, to 4 to 4·5 for the rounded, while some forms reach about 6μ in length. Three flagella are present two of which are of more or less equal length, the other longer, sometimes 7μ long. The direction of the flagella varies but is generally forward; the authors did not find that any of the flagella was a trailing flagellum. The flagella originate from two blepharoplasts the one which lies anteriorly giving rise to the two equal flagella, the posterior to the long flagellum. The nucleus about 1μ in diameter lies behind and near the blepharoplasts. No cytostome, axostyle or undulating membrane was seen. Sections on development and classification follow [see above]. No pathogenic bacteria were found on culture and the symptoms are attributed to the flagellate. B. B.

BRUG (S. L.). **Trichomonascysten.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 3. pp 317–356. With 1 plate.

The author gives a historical account of previous records of the finding of Trichomonas cysts, and discusses the evidence for and against the various records. He himself has studied Trichomonas in guinea-pig and rat gut, staining with Heidenhain's iron haematoxylin. A pure infection of Trichomonas was not obtained, there being always other protozoa present. He gives a description of the characters of Trichomonas as found in the active state in the caecum, and proceeds then to show that lower down in the gut these forms are replaced by inactive encysted forms. He bases his argument on the detection in the cyst forms, of important characters which belong to the free form. Inside the cyst wall he finds persisting the marginal filament of the undulating membrane, the basal fibril, the nucleus with distinct caryosome and the granules along the basal fibril. Preparations must be so strongly differentiated that the undulating membrane filament and the basal fibril become indistinct if one wishes to study the nucleus. Evidences of nuclear division in the cysts was found. Axostyle and free flagella were not seen in the cysts.

B. B.

i. MARTOGLIO (F.). **Su di un nuovo genere di parassiti del sangue.**—*Ann. d'Igiene.* 1917. Sept. 30. Vol. 27. No. 9. pp. 561–563. With 1 plate.

ii. LANFRANCHI (A.). **Su di un nuovo genere di parassiti del sangue.**—*Ibid.* Nov. 30. No. 11. pp. 697–699. With 4 text figs.

i. While studying the occurrence of spirochaetes in fowls in Eritrea, the author made the following observation. A fowl was infected experimentally with Spiroschaudinnia on the 25th March 1915. In twenty-four hours a few parasites were visible in its blood, on the 27th they had increased in number, on the 28th they were very numerous and commencing to agglutinate and on the 29th they were agglutinated in masses; on the 30th and 31st negative. On April 3rd flagellates were seen in the blood and they increased in number on the 4th and 5th; on the 6th they were rare; the fowl died on the evening of the 6th. Organ smears presented small numbers of the parasite. In stained preparations no trace of cytostome could be seen; the size being $8{\cdot}5\mu$ to $10{\cdot}5\mu$ by $10{\cdot}5\mu$ to 12μ. The trophonucleus measured $2{\cdot}4\mu$ to $2{\cdot}8\mu$ by $3{\cdot}2\mu$ to $4{\cdot}8\mu$, oval in shape and placed somewhat laterally, and the kinetonucleus, elongated in shape, $0{\cdot}8\mu$ to 1μ by 1μ to $1{\cdot}6\mu$. Four flagella free in all their length, 10 to 15μ long, and one bordering an undulating membrane are present. Two axostyles originating in the region of the kinetonucleus traverse the body to fuse in the opposite extremity; sometimes they remain separated.

The author proposes the generic name and gives his diagnosis of the genus Haemotrichomonas for this organism. He refers to the organism described by PLIMMER from snakes' blood and applies to it the name *Haemotrichomonas ophidium* while the present parasite is called *H. gallinarum*

ii. The author refers to the paper by MARTOGLIO and draws attention to the fact that he (the author) described and figured a pathogenic blood parasite of pigeons in 1908* which he placed in the Mastigophora. On reviewing this parasite in the light of MARTOGLIO's observations he considers it to correspond morphologically to Trichomonas. He accepts the genus *Haemotrichomonas* and adds to it this the third species.—"*Haemotrichomonas columbae* (F. Martoglio 1917) discovered by Lanfranchi (1908) in warm blooded animals, and capable of infecting rabbits and guinea-pigs." The author reproduces here some of his original figures.

B. B.

FRANÇA (Carlos). **Quelques observations sur les Triconymphidae.**—*Ann. Inst. Pasteur.* 1916. May. Vol. 30. No. 5. pp. 195-204.

The author considers that the descriptions of these parasites ordinarily given in text books are incomplete and give rise to much discussion. He cites the description of *Triconympha agilis* by BÜTSCHLI, which has been reproduced almost without modification in the most recent works on Protozoology, with the figure from LEIDY'S work. The figure which represents the parasite in the fresh state is incorrect. He proceeds to describe this parasite, which was first discovered by LEIDY in 1877 in *Termes flavipes.* He considers next the form which LEIDY figures as a young form of *Triconympha agilis*, and which has been referred to by BÜTSCHLI and DELAGE and HÉROUARD ; he thinks it is quite different from those hitherto described and founds a new genus, *Leidya*, for it, with the specific name *L. metchnikovi.* França gives the following classification :—

Ord. *Hypermastigina* Grassi and Foà (1911)
Forms usually very large, having numerous flagella disposed in a very variable manner.
This order comprises the families :—
I. *Calonymphidae* Grassi. Large forms with multiple nuclei. Each nucleus has a blepharoplast corresponding to it, from which one or several flagella proceed ; axial filaments.
This family contains the genera ;
  A. *Calonympha* Foà (1905)
    C. grassii Foà, parasite of Termites in Chili.
  B. *Stephanonympha* Janicki (1911)
    S. silvestrii Janicki (1911)
II. *Lophomonadidae* Grassi (1911) Large forms with a single nucleus. Axial rod enveloping in its anterior point the nucleus. Basal apparatus well developed.
This family includes the genera :
  C. *Lophomonas* Stein (1860)
    L. blattarum Stein (1860) parasite of *Periplaneta orientalis.*
  D. *Joenia* Grassi (1885).
    J. annectens Grassi (1885), parasite of *Calotermes flavicollis.*

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* LANFRANCHI. Di una speciale forma morbosa nei piccioni dovuta ad un emotozoario della famiglia dei mastigofori. *Moderno Zooiatro* 1908. Supplement to No. 6 p. 289.

III. *Triconymphidae* Leidy (1877). Large forms with a single nucleus. These forms do not possess an axial filament. Siderophile structure at the anterior extremity.

This family contains the genera :

E. *Triconympha* Leidy (1877)
  T. agilis Leidy (1877) parasite of *Termes flavipes* (America) and of *T. lucifugus* (Europe).
F. *Gymnonympha* Dobell (1910)
  G. zeylanica Dobell (1910) parasite of *Calotermes militaris*, Ceylon.

IV. *Holomastigidae* n. fam. Large forms with a single nucleus without axial rod. Flagella over the whole surface of the body. These flagella are inserted on one or more lines running straight or in spirals.

The family comprise the genera :

G. *Pseudotriconympha* Grassi and Foà (1911) male form or form A. of *Triconympha hertwigi* Hartmann.
  P. hertwigi (Hartmann) parasite of *Captotermes hartmanni* (Holmgr.) Brazil.
H. *Holomastigotoides* Grassi and Foà (1911) female form or form B. of *T. hertwigi* Hartmann.
  H. hertwigi (Hartmann) parasite of *Captotermes hartmanni*.
I. *Leidya* n.g.
  L. metchnikovi, n.sp. parasite of *Termes lucifugus* of Portugal and probably of *T. flavipes* (America).

B. B.

DA FONSECA (Olympio Oliveira Ribeiro). **Sobre os flagellados parasitos.**—*Brazil Medico.* 1917. Sept. 8. & Dec. 8. Vol. 31. Nos 36 & 49. pp. 305-306 ; 417 ; 1918. Jan. 26. Vol. 32. No. 4. p. 25.

i. The author discovered in a reptile of the genus *Amphisbena* two species of flagellate, one of which he considers to be *Octomitus dujardini* Dobell ; the other is described in this paper, and is assigned to the genus *Trichomastix* Blochmann with the specific name *Trichomastix saurii*, n.sp. The parasite is elongated piriform in shape, and has a strong axostyle which projects a quarter of its length beyond the posterior end of the body ; it is provided with a caryosome nucleus situated anteriorly, and four free flagella, of which one, much longer than the others, trails behind. Length of parasite 6–12μ, width 3–6μ, nucleus 2μ in diameter.

ii. The author gives the name *Waskia wenyoni* to a parasite which he discovered in Brazil in *Cebus caraya*. Differences in the forms of division exist which, the author considers, authorise his creating a new species of Waskia. [This *Bulletin*, Vol. 9, p. 408.]

iii. This is a brief paper in which the author gives the result of his examination of ten patients taken at random in the hospital at Bauru, State of S. Paulo. Of the ten examined two had intestinal flagellates ; in each of these *Chilomastix mesnili* was present and in one an associated infection with *Enteromonas hominis* da Fonseca occurred. Reference is made to the paper of CHALMERS and PEKKOLA on this organism [this *Bulletin*, Vol. 11, p. 63]. None of the three flagella is constantly directed backwards ; all are habitually directed forwards.

B. B.

RODHAIN (J) & VAN DEN BRANDEN (F.). **Essais sur la pluralité des espèces flagellées parasitant le tube digestif des Invertébrés. Note préliminaire.**—*Bull. Soc. Path. Exot.* 1917. Nov. Vol. 10. No. 9. pp. 811–814.

By means of numerous experiments which consisted in feeding bred insects on flagellates from the intestine of insects of a different genus it was found that

(1) The Trypanosomidae of Pycnosoma do not adapt themselves to the intestine of the genus Stegomyia, nor of *Cimex rotundatus.*

(2) The Trypanosomidae of *Glossina palpalis* do not adapt themselves to the intestine of Stegomyia, nor of *Cimex rotundatus.*

The authors say the negative results of their experiments speak in favour of the plurality of the flagellate species which are parasites of the digestive tube of invertebrates.

B. B.

CHATTON (Édouard) & BLANC (Georges). **Notes et réflexions sur le toxoplasme et la toxoplasmose du Gondi** (*Toxoplasma gondii* **Ch. Nicolle et Manceaux 1909**).—*Arch. Inst. Pasteur de Tunis.* 1917. Oct. Vol. 10. No. 1–2. pp. 1–40. With 1 plate.

After a short account of the history of the observations on Toxoplasma the authors give the results of their own experience with the parasite as it effects gondis. They deal with the subject from many points of view and in a very complete manner. Curves giving the incidence of the infection according to the months of the year demonstrate that cold has a considerable influence, in captive animals at least, in determining increased seasonal mortality. Tables are given in which are enumerated the natural hosts of Toxoplasma and the results of experimental inoculation. Morphology is given in detail and a list of ectoparasites of the gondi with suggestions as to which may prove worthy of investigation as vectors.

The list of ectoparasites of the gondi in nature which is given is—*Rhipicephalus sanguineus, Hyalomma* ? sp., *Trombidium* sp., *Coenopsylla mira, Thersestes* (*Mycterotypus*) *laurae* Weiss, and *Simulium liniatum.* Of these the authors consider that in nature only the *Rhipicephalus* and *Trombidium* come under suspicion as vectors. In the laboratory *Rhipicephalus sanguineus, Dermanyssus, Ctenocephalus serraticeps* and *Cimex lectularius* should receive attention.

Next to the gondi the mouse is most easily infected by virus from gondis, but many small rodents are susceptible to intraperitoneal inoculation. The white rat is refractory. The rabbit is infected only by the intravenous mode. The cat is more susceptible than the dog.

B. B.

FRANÇA (Carlos). **Sur la classification des hémosporidies.**—Reprint from *Jl. Sciências Matemáticas, Fisicas e Naturais.* Ser. 3. No. 1. 41 pp. With 29 text-figs. 1917. Lisbon: Imprensa Nacional.

The author commences by stating " Dans la classification des Haemocytozoa ou Haemosporidia la plus grande confusion règne encore, ce qui fait désirer une révision de leur classification." On the first page he refers to the "order" Haemosporidia and a few lines lower down says, "the Haemosporidia constitute one of the 'sub-orders' of the Sporozoa."

Some attention must be paid to the circumstances in which the family Haemamoebidae appears in the author's classification. The suborder Haemosporidia is stated on page 1 to comprise four families, viz., (1) Haemogregarinidae; (2) Plasmodidae; (3) Piroplasmidae; (4) Toxoplasmidae. On page 16, however, the second family is given thus without explanation: (2) Fam. Haemamoebidae, Ross 1899. Syn. Plasmodiidae, Luhe 1906.

Not content with altering the name of his second family of the *Haemosporidia*, França commences his definition of the Haemamoebidae, as he does prevously that of the Haemogregarinidae, with the word "Haematozoaires" without having defined the term Hématozoaires. There is, in fact, on the part of the author not only a constant ignoring of his own previous definitions but also a repeated introduction of undefined terms.

To illustrate another peculiarity of this classification, namely, the repetition of characters implicit in larger groups, we may take the author's description of two genera of the Haemogregarinidae, Haemogregarina and Hepatozoon.

Genus. Haemogregarina. "*Hématozoaires vermiculaires non pigmentés* habitant des hématies. *Schizogonie par des kistes dans les organes internes*," etc.

Genus. Hepatozoon. "*Hematozoaires vermiculaires sans pigment* et habitant les leucocytes. *Schizogonie dans des kistes dans les organes internes*," etc.

The italics are the reviewer's and are put here in order to draw attention to the fact that the italicised portions of these generic definitions have already been given as family characteristics. The family definition previously given is as follows: (1) Fam. Haemogregarinidae. *Hématozoaires vermiculaires* habitant des hématies ou des leucocytes *et ne possédant jamais de pigment. Schizogonie à l'interieur de kistes dans les organes internes.*

Even more puzzling is the author's habit of interpolating suddenly and without any apparent principle a stray character. For example, among his characters of the genus Leucocytozoon, he states that they inhabit red cells and that their microgametes are flagelliform, facts which are not mentioned for any other of his genera of Haemamoebidae, and which should not, according to this classification, require to be mentioned, for the simple reason that his definition of the family Haemamoebidae states that they all inhabit red cells and have flagelliform microgametes. Similarly, it is mentioned that the Haemamoebidae have their sporogony cycle in the invertebrate: no mention is made of this fact as regards the families Haemogregarinidae, Piroplasmidae, and Toxoplasmidae. It is given, however, as a character of the suborder Haemosporidia and therefore should apply to all these families equally.

Apart from such defects as can be found in the substance of the classification, there are also formal defects which lead to confusion. Thus, under the family Piroplasmidae, we find genus f. Achromaticus and next to it genus f. Rangelia; word misprints are also found.

It has to be borne in mind that the criticism contained in this review has not touched the question whether the author's classification is justified or necessary. All that has been done is to assume that the author has made out his case that the description of this group of protozoa is in a state of confusion and then to accept and examine the classification, which is intended to rectify this confusion, on its own merits. It is unlikely that anyone who reads França's paper to the end will disagree with his statement quoted at the beginning of this review, but whether a perusal of it will greatly clarify the reader's ideas is extremely doubtful. França's simplification tends to be on the *lucus a non lucendo* principle. The author gives no indication as to the scale of his drawings.

B. B.

FRANÇA (Carlos). **Notes sur la biologie des Hémosporidies. La schizogonie des Hémogrégarines.**—*Bull. Soc. Path. Exot.* 1918. Mar. 8. Vol. 11. No. 3. pp. 171–173.

The author made experiments with a view to discovering the cause of a phenomenon which he had observed some years ago, namely the formation of cysts in the red blood cells of *Lacerta muralis* infected with *Haemogregarina bicapsulata.* This result was obtained in preparations sealed with paraffin and watched for several hours. The experiments carried out by França were as follows:—(1) The heart of infected *L. muralis* was removed after ligature of the vessels and kept in physiological saline; after three hours a large number of cysts with macro- and micromerozoites was found. (2) The liver after ligature of the vessels was kept for 2 to 3 days in physiological saline; the cysts were found in immense numbers. França considers that two factors enter into these experiments, namely immobilization of the infected blood in a non-coagulated state, and diminished oxygenation, the former being the more important. LAVERAN and PETTIT in 1909 recommended the following procedure for the study of the multiplication of hemogregarines. The viscera of an infected animal bled white were placed in the ice chest for 4–5 days, then ground up, and the pulp obtained shaken with salt solution and centrifuged. Preparations made from the deposit in the region of the red cell layer showed cysts even when they were rare and not to be found in ordinary smears. França considers that this procedure is successful because not only cysts existing at the time of death but newly formed cysts are present. He emphasizes the important effects which mechanical conditions may produce in the biological phenomena of protozoa. He has observed in the heart blood and in the vessels sporogony phases of certain Haemosporidia.

B. B.

KREMPF (A.). **Un hématozoaire endoglobulaire nouveau de l'homme** (***Haemogregarina hominis***)**.**—*C. R. Acad. Sci.* 1917. June 18. p. 965.

The author found the parasite which he here describes in blood from spleen puncture in a Chinaman from Tien-Tsin, who had malaria and splenomegaly. No parasites were found in the blood except in the spleen, but liver puncture was not permitted by the patient. Even in the spleen they were scanty. They occur in the form of vermicular and comma shaped sporonts enclosed in red cells, or free as the result of manipulation. The red cells infected are enlarged and distorted and enclose a capsule measuring 10μ by 5μ which contains the vermicular sporont folded once or twice on itself. Unequal division of the parasite takes place, one portion being U shaped and retaining its vermicular form, the other being comma shaped. In spite of difference of dimensions, these two portions have similar cytological structure. Each has a granular nucleus coloured dark red by eosin azur, and a deep blue protoplasm in which chromatoid masses of rounded or oval shape are present. The free forms do not differ from the encapsuled forms. The measurements of the largest extended parasite are 20μ by 1·5μ broad; the comma shaped sporonts measure 6 to 8μ by 1·5μ. No young forms nor schizogony forms were found. The author proposes the name *Haemogregarina hominis* for the parasite.

B. B.

D'UTRA E SILVA (Oscar) & ARANTES (J. B.). **Sobre uma hemogregarina da gambá.** [A Haemogregarine of the Opossum, *Haemogregarina didelphydis* n. sp.]—*Mem. Inst. Oswaldo Cruz.* 1916. Vol. 8. No. 2. pp. 61–63. With 1 plate.

The authors found in the blood of a male adult opossum a haemogregarine to which they give the name *Haemogregarina didelphydis*. The infected animal was one of fifty examined from Merity. The parasite was found in the red cells. In fresh preparations made from the blood of the tail they appeared as hyaline, motionless bodies round or ovoid in shape having in the centre a rounded nucleus of greater refractiveness than the protoplasm. No pigment was seen; the parasites were rarely free in the plasma, part or whole of an erythrocyte being occupied by each as a rule. In fixed and stained preparations the measurements were, 8 to 10μ long by 4 to 6μ broad. Organ smears and sections were made. In the former scanty parasites were found, while sections of the pancreas showed cysts included in the cells of the acini and pushing the nucleus to one side. The parasite on entering the tissue cell grows at the expense of the cell protoplasm and displaces the cell nucleus. The nucleus of the parasite divides and give rise to the merozoites up to 18 in number. The cysts may attain a size of 22μ by 12μ. Opossums, rabbits, guinea-pigs and white rats were inoculated with blood and tissue fluids but no infection occurred.

B. B.

ESCOMEL (E.). **Le *Phyllodactylus gerrhopygus* au Pérou. Son infection par une hémogrégarine.**—*Bull. Soc. Path. Exot.* 1917. Dec. Vol. 10. No. 10. pp. 873–879. With 1 fig.

Of 75 specimens of platydactyls—species *Phyllodactylus gerrhopygus*—examined, 3 were infected by a haemogregarine. The parasite did not appear pathogenic; it occurred intracellularly and free. A description of the forms seen is given. LAVERAN, who discussed the paper, referred to a cleft which Escomel described in the parasites.

This Laveran considers to be due to the folding of the pointed end of the parasite on itself. In such folded specimens the nucleus tends to lie near the wide anterior end of the parasite. He notes the fact that Escomel does not deal with multiplication forms and recommends especially liver smears for the purpose of studying such forms.

B. B.

CLARK (Herbert C.). **Bovine Piroplasmosis in Panama.—A Preliminary Report.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. July-Dec. Vol. 9. Pt. 2. pp. 116–121.

Several calves at Corozal Hospital farm died of a disease of which the cause was not discovered. The symptoms were emaciation and anaemia. Post mortem examination did not reveal anything. The animals were tick infested. On Nov. 22 1916 two calves which were moribund were killed and examined immediately. Smears from the organs were made and in those made from the brain *Babesia bigemina* was found in large numbers in the capillaries. In films from the peripheral blood and in other organs they were found with difficulty. The urine contained albumin but no red corpuscles nor haemoglobin. Similar results were obtained in two sick calves from near Miraflores. Twenty-five suspected animals were thereupon slaughtered and in each one the organism was discovered in the brain. There were five of these in which the parasite was present in small numbers. Of the cattle two were native cows, the others being mixed-bred calves the offspring of imported American cattle and native cattle. The two native cows were lightly infected and possibly carriers. The author points out the economic importance of the existence of this disease and makes recommendations with regard to its suppression. As to the local form of the disease, the absence of parasites in the peripheral blood, the absence of haemoglobinuria and the usual changes in the spleen, compel the author to regard it as a modified form. Ticks removed from animals examined were identified as *Margaropus annulatus.* The author promises further observations on the disease.

B. B.

STEFKO (W.). **Piroplasmose et Anaplasmose en Turquie (1916).**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 723–724.

Piroplasma bigeminum, P. annulatum and *Anaplasma centrale* were frequently found in oxen from Russia examined in Trebizond. The mortality was 80–90 per cent. The carrier is *Boophilus annulatus. Ixodes corniger* Kol. and *Rhipicephalus simus* Koch are less prevalent in this district.

B. B.

VELU (H.). **Les affections du cheval à parasites endoglobulaires au Maroc.**—*Bull. Soc. Path. Exot.* 1918. Jan. Vol. 11. No. 1. pp. 26–27.

" Equine piroplasmosis " was recorded in Chanoia in 1908 and has been proved to exist in isolated cases throughout Morocco. The author has been able by blood examination to divide the disease into two forms one due to *Piroplasma caballi*, the other to *Nuttallia equi*. A brief description of the clinical phenomena produced by these parasites and of the findings at autopsy is given.

B. B.

SERGENT (Etienne). **Sur un Leucocytozoon de la perdrix rouge d'Algérie.** (*Perdrix rubra* Brisson).—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 701–702. With 1 fig.

In two out of three red partridges examined in Algeria the author found a Leucocytozoon, only the adult gametes being present in the blood. The parasite is tapered at each extremity and may measure 46μ long. A short description of the male and female forms is given.

B. B.

LEGER (M.) & MOUZELS (P.). **Hématozoaire endoglobulaire non pigmenté d'une Anatidée.**—*Bull. Soc. Path. Exot.* 1917. Oct. Vol. 10. No. 8. pp. 699–700.

The authors refer to a paper by SERGENT which deals with a form of Proteosoma almost devoid of pigment in canaries [this *Bulletin*, Vol. 10. p. 255]. They proceed to give an account of a parasite which they found in red blood cells of the duck, *Anas discors* Latham. The parasite when fully developed is elongated and measures 8 to 9μ by 4·5μ, the young forms being rounded and measuring about 2μ. No pigment is seen, the nucleus is distinct but the protoplasm stains poorly; the host cells are not enlarged, do not lose their staining properties and the nucleus is not displaced markedly. Male and female forms cannot be distinguished. The parasite is not Haemoproteus nor a Plasmodium nor Toxoplasma.

B. B.

DA CUNHA (Aristides Marques). **Sobre a presença do balantidium no cavallo. Nota prévia.** [Balantidium in Horses. Preliminary Note.]—*Brazil Medico.* 1917. Oct. 6. Vol. 31. No. 40. p. 337.

A description is given of a balantidium found in the caecum and large intestine of a horse. The parasite measured 40 to 60μ by 35 to 40μ. A similar parasite had previously been found by the author in horse material, and it is noted that in these two horses no other ciliates were found in the caecum.

B. B.

i. PAPPENHEIMER (Alwin M.), VERMILYE (H. N.) & MUELLER (J. H.). **On the Etiology of Trench Fever (A Preliminary Communication).** —*Brit. Med. Jl.* 1917. Oct. 13. pp. 474–476. With 3 text-figs.

ii. PAPPENHEIMER (Alwin M.). **The Etiology of Trench Fever.** [Correspondence.]—*Ibid.* Oct. 27. p. 568.

i. The authors have found in blood smears, in cultures from the blood, in sections of periosteum and fascia and in cultures from these tissues an organism which they assign provisionally to the genus Piroplasma. Out of 150 cases of trench fever this organism was found in 9 in the peripheral blood.

They checked their observations by " many controls prepared with the identical stains."

Culture on the condensation water of meat infusion agar slants was apparently successful. Inoculations of rabbits, guinea-pigs and white rats with blood of patients and with suspensions of tissue gave no positive result either as regard febrile reaction or presence of parasites in the blood. Suggestions of a cycle in the louse are made.

ii. The letter concludes :—We wish to state that, as a result of our further experiences, we do not at present believe that the bodies described by us are micro-organisms or related in a causative way to the production of trench fever.

B. B.

LOW (George C.) ; DOBELL (Clifford). **The " Haemogregarine " of Trench Fever.** [Correspondence.]—*Lancet.* 1917. Sept. 22. pp. 473–474.

HENRY (Herbert). **The " Haemogregarine " of Trench Fever.** [Correspondence.]—*Brit. Med. Jl.* 1917. Dec. 1. pp. 739–740.

Low notes the importance of DIMOND's discovery should it prove to be correct. He casts doubt upon it.

Dobell criticises adversely DIMOND's paper [see this *Bulletin*, Vol. 10, p. 256]. He cannot understand the description given ; and the figures are also difficult of interpretation. He says " No protozoologist would, I believe, care to express a very definite opinion on these forms until he had studied the actual specimens from which they were drawn."

Henry has carried out water-filtering and culture experiments which he considers prove that DIMOND was dealing with protozoal biflagellates and a bacillus occurring in the distilled water which he was using, and that the parasite stages described by DIMOND are merely various stages of disintegration of these contaminating elements.

B. B.

ENTERIC FEVERS IN THE TROPICS.

Miller (Charles Hewitt). **Goulstonian Lectures on Paratyphoid Infections.** Delivered before the Royal College of Physicians of London. —*Lancet.* 1917. May 19, June 2 & 16, pp. 747–751; 827–832; 901–905. With 10 charts.

These three lectures contain an excellent summary of what is known concerning the paratyphoid infections. The lecturer has obtained his material from recent literature, from notes of cases in the war area and from cases observed in the Red Cross Hospital, Netley. Long notice of the lectures is unnecessary since readers of this *Bulletin* will find individual records, upon which our knowledge of paratyphoid fevers is based. fully noticed in volumes 6 to 10.

J. H. Tull Walsh.

Bourges (Henry). **Les formes actuelles du syndrome typhoïdique (infections à bacille d'Eberth et à bacilles paratyphiques).** *Arch. Méd. et Pharm. Nav.* 1916. Oct., Nov. & Dec Vol. 102. Nos. 10, 11 & 12. pp. 295–312; 366–383; 434–448; 1917. Jan. Vol. 103. No. 1. pp. 41–45.

The length of this paper is due to detailed examination of technique, symptoms and complications in cases for 1913, 1914 and 1915. The enteric fevers are considered in separate sections and, finally, among protected persons.

J. H. T. W.

Medical Research Committee. **National Health Insurance. A Report upon the Use of Atropine as a Diagnostic Agent in Typhoid Infections.** By Capt. H. Fairley Marris. 50 pp. Special Report Series, No. 9. 1917. London: H.M. Stationery Office. [Price 1*s.* net.]

In Vol. 9, No. 9, of this *Bulletin* a full notice of Captain Marris' experiments with atropine was given. The investigations are continued and enlarged in the above "Report."

The following extracts will add to what was recorded in the *Bulletin* for June 15th, 1917 :—

"The main purpose of this report is to show that under the conditions of work experienced in military hospitals in France, the subcutaneous injection of atropine is an excellent diagnostic test in distinguishing an infection belonging to the Typhoid Group. . . .

"We are faced by the fact that atropine fails to quicken the heart rate at certain stages of active typhoid infection; infection, interpreted as the mere presence of the bacteria in the body, also fails to affect the response—witness the soldiers who are carriers of the disease. . . . The response of the heart to atropine is deficient or is absent, so it would seem, only during the stage when the body is failing fully to cope with the poison introduced within it."

The "report" contains other very interesting investigations which must be briefly noticed :—

"Ascher (*Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris*, 1914, Vol. 30, pp. 562–567) describes the effect produced on the heart rate by pressing upon the eyeball in a number of conditions. In normal individuals firm pressure maintained on the eyeball produces slowing of the heart's action."

TABLE XII.

Effects of Ocular Compression in Healthy Subjects.

	Pulse Before.	Pulse After.	Fall.
	Per minute.	Per minute.	
1. W.	88	72	16
2. S.	84	54	30
3. S.	70	48	22
4 A.	90	76	14
5 A.	80	64	16
6 A	70	59	11
7. A.	64	60	4
8.	72	54	18
9.	83	70	13
10.	67	62	5

TABLE XIII.

Effects of Ocular Compression in Typhoid.

	Day of disease.	Pulse before.	Pulse after.	Fall.	Diagnosis.
1. L.	7th	60	60	0	Para. B isolated.
2. H.	20th	92	92	0	do.
3. R.	8th	81	81	0	do.
4. J.	11th	74	72	2	T. isolated.
5. D.	29th	84	82	2	do.
6. R.	29th	60	60	0	Para. B isolated.
7. H.	35th	60	62	–2	Para. A isolated.
8. E.	33rd	80	72	8	Typhoid group by agglutination.
9. Hy.	6th	66	66	0	
10. W.	12th	82	78	4	
11. Sh.	50th	78	80	–2	
12. Bi.	12th	80	78	2	
13. Ba.	9th	91	92	–1	
14. G.	15th	70	78	–8	
"	22nd	66	66	0	
"	43rd	68	64	4	
"	50th	70	60	10	
"	70th	72	58	14	
15. F.	10th	60	60	0	Para. B isolated.
	18th	80	82	–2	
	23rd	88	80	8	
16. Z.	17th	88	92	–4	Para. B by agglutination.
17. R.	14th	68	72	–4	Para. B isolated.
18. A.	11th	68	66	2	T. by agglutination.
19. R.	20th	62	64	–2	do.
20.	6th	84	86	–2	Para. A by agglutination.
21.	Day before inoculation T.A.B.	84	70	14	
	8 days after	80	78	2	
	20 do.	86	70	16	

As will be seen from the tables adrenaline when administered intravenously to patients belonging to the Enteric Group during the acute stage of the disease and while the patients were refractory to atropine produced a rise of pulse rate of some 38 to 45 beats per minute similar to that witnessed in healthy men (25 to 45 beats) *But the injection did not produce the rise of systolic blood pressure seen in healthy men*

TABLE X

Effects of Adrenaline in Healthy Men

	Dose in Minims	Pulse Rate Before	Pulse Rate After	Rise	S B P Before	S B P After	Rise
1 T	5	60	120	60	130	220	90
2 C	2 5	67	120	53	120	180	60
	5	68	95	27	115	140	25
	25	75	100	25	90	100	10
3 W	25	85	130	45	133	190	57
4 Meg	25	78	103	25	120	180	60
5 P	25	80	108	28	150	195	45

Effects in cases of "Irritable Heart" (D A H)

	Dose in Minims	Pulse Rate Before	Pulse Rate After	Rise	S B P Before	S B P After	Rise
1 C	25	95	120	25	143	190	47
2 B	25	90	120	30	140	170	30

TABLE XI

Effects of Adrenaline in Typhoid Cases

	Dose	Day	Pulse Rate Before	Pulse Rate After	Pulse Rate *Rise*	S B P Before	S B P After	S B P *Rise*	Diagnosis
1 Hor	25	17th	80	125	45	95	95	0	T by agglutination
2 Ho	25	16th	80	120	40	98	102	4	Para B by agglutination
3 B	25	11th	80	120	40	90	93	3	Para B isolated
4 S	25	13th	66	104	38	95	102	7	Typhoid organism isolated
5 B	25	20th	90	108	18	112	130	18	Para B by agglutination
6 F		9th	84	120	36	90	95	5	Para B isolated
7 M		12th	72	115	43	94	104	10	T isolated

J H T W

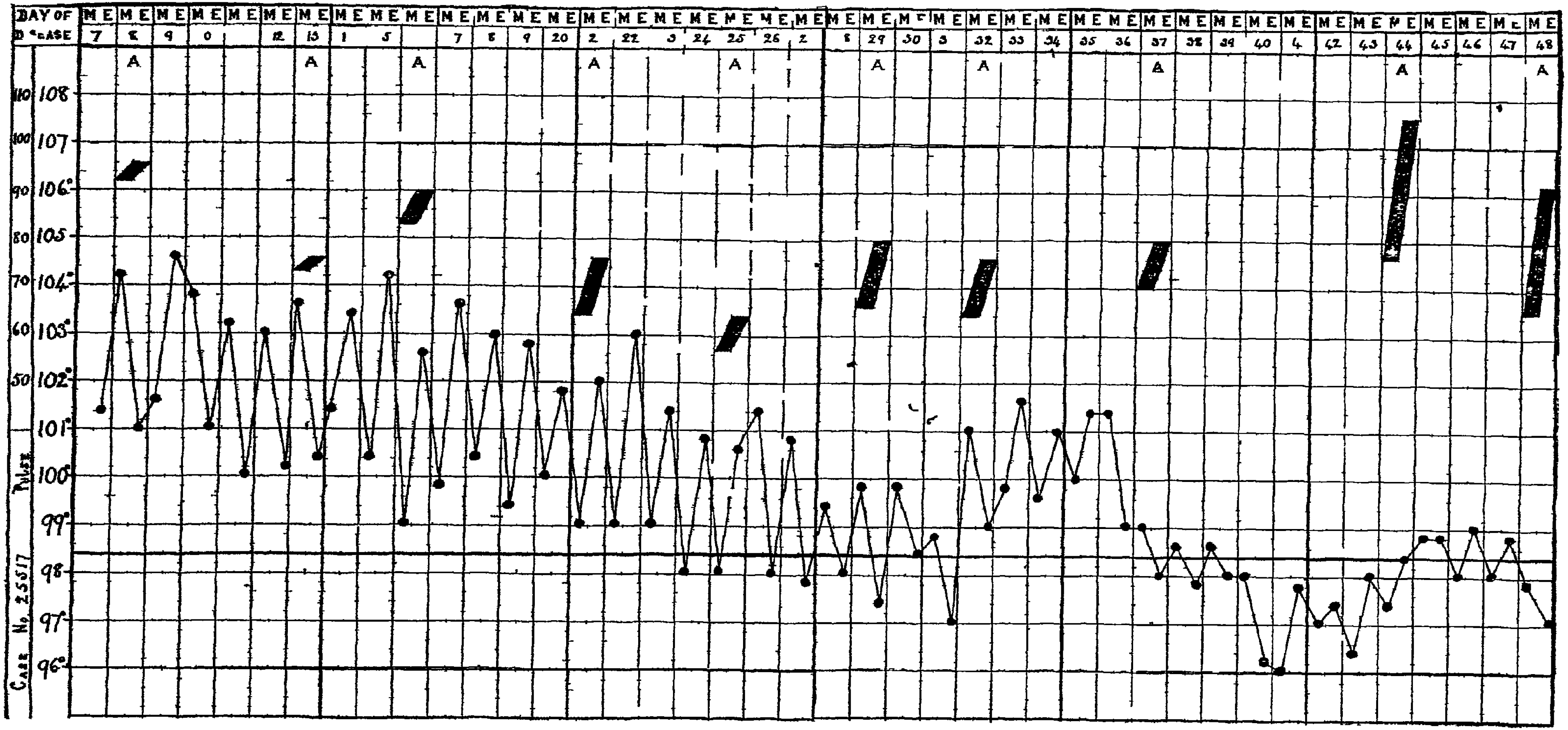


CHART 7 —Male aged 20 white Diagnosis typhoid fever admitted on the seventh day of the disease Widal reaction negative blood culture negative Widal positive at a later date Atropin tests Dose one thirtieth grain of atropin sulphate (hypodermically)

MASON (Edward H) *Arch Intern Med*]

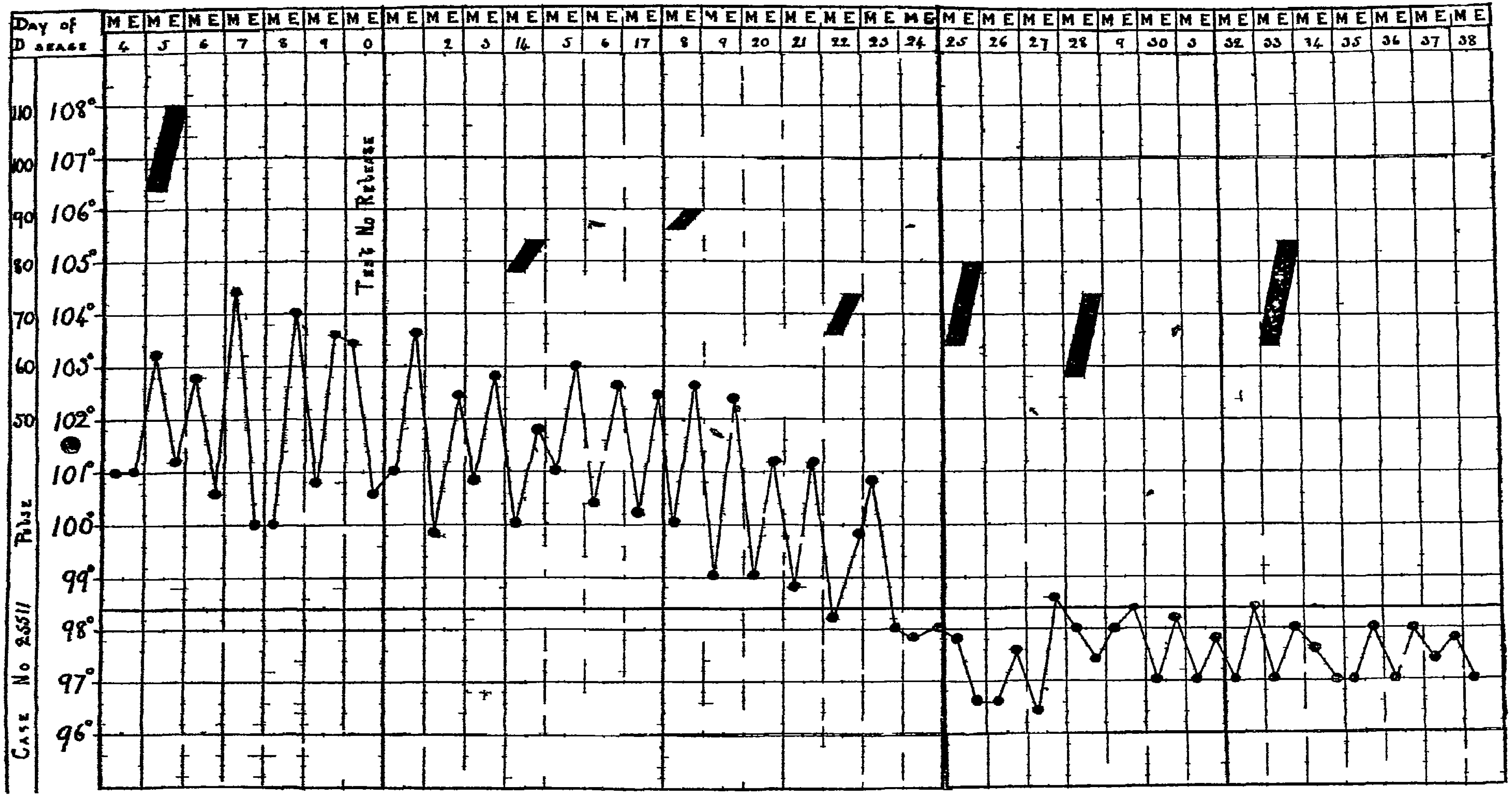


CHART 8 —Man aged ?5 Diagnosis typhoid fever admitted on the fourth day of the disease Widal reaction negative blood culture positive Atropin tests Dose one thirtieth grain atropin sulphate (hypodermically)

[Chart 7 and 8 reproduced by permission from *The Archives of Internal Medicine*

MASON (Edward H.). **The Value of the Atropin Test in the Diagnosis of Typhoid Fever.**—*Arch. Intern. Med.* 1918. Jan. 15. Vol. 21. No. 1. pp. 1–13. With 8 charts.

Dr. Mason's work has been carried out at Montreal and continues work done by H. Fairley MARRIS who first suggested the "Atropin Test" [see this *Bulletin*, Vol. 9, p. 466 ; also p. 432.] In the Royal Victoria Hospital, Montreal, "within the last few months we have carried out the test according to MARRIS' technic on 109 patients, sixty-three of them suffering from typhoid, or paratyphoid B infections, and forty-six nontyphoid cases. In all, 305 tests were performed." The author then quotes the technique given by MARRIS (*q.v.*). Charts 7 and 8 can be compared with those given by MARRIS [*loc. cit.*].

"Eleven of the typhoid group failed to give the reaction." These cases are classified in "Table 2."

"The reaction becomes positive at about the tenth and disappears at about the thirty-first days of disease.

"In the nontyphoid group three cases gave a positive reaction. We offer no explanation of these findings.

"In the diagnosis of fevers of the enteric group, we believe the test to be of great value, and in many cases undoubtedly precedes the Widal reaction."

TABLE 1.

Results of the Atropin Test in Seven Cases Showing the Variability in Time of Appearance of a Positive Widal Reaction.

Case No	Sex	Day of Disease	Release	Widal (Mac.)	Blood Culture
25537	♂	6 10	87–100=13 82– 88= 6	5th day of disease, negative for B. typhosus	Positive for B. typhosus
25625	♂	9 13	77– 98=21 82– 88= 6	8th day of disease, positive (1–80) for B. typhosus	Positive for B. typhosus
25662	♀	10 16	111–132=21 115–120= 5	10th day of disease, positive (1–160) for B. typhosus	Positive for B. typhosus
25515	♂	5 10	94–110=16 86– 86= 0	4th day of disease, negative for B. typhosus	Positive for B. typhosus
25521	♂	18 22	81–104=23 79– 86= 7	18th day of disease, positive for B. typhosus	Positive for B. typhosus
25128	♂	11 15	98–116=18 95–100= 5	15th day of disease, negative for B. typhosus	Positive for B. typhosus
25700	♀	9 15	106–122=16 114–122= 8	8th day of disease, positive for B. typhosus (1-80)	Positive for B. typhosus

"As a means of diagnosing the syndrome termed vagotonia we would suggest the use of atropin in the above manner."

J. H. T. W.

TABLE 2.

Data Concerning Eleven Cases which Failed to Give a Positive Reaction to the Atropin Test.

Serial No.	Case No.	Sex.	Age.	Day of Disease.	Release.	Widal (Mac.)	Blood Culture.	Remarks
1	25310	♂	32	6	99–116=17	Negative for B. typhosus (5th day of disease)	Negative for B. typhosus (5th day of disease)	Only 1 test diagnosis doubtful
2	25296	♂	32	11 25 31 42	60– 73=13 48– 65=17 57–101=44 82–100=18	Negative for B. typhosus (10th day of disease)	Positive for B. typhosus (10th day of disease)	
3	25284	♂	28	28	108–124=16	Negative for B. typhosus (28th day of disease)	Positive for B. typhosus (28th day of disease)	Died 9 days later; only one test made
4	25445	♂	18	11 19 27 31 35 38 41	99–126=27 88–100=12 66– 84=18 77– 92=15 76– 90=14 77– 90=13 72– 90=18	Negative for B. typhosus (9th day of disease)	Positive for B typhosus (9th day of disease)	

5	25209	♂	33	10	94–110=16	Positive (1–20) for B typhosus (9th day of disease)	Positive for B. typhosus (9th day of disease)	Died 10 days later one test
6	25595	♂	18	15 20	86–104=18 80– 94=14	Positive for B. typhosus (15th day of disease)	Positive for B. typhosus (15th day of disease)	Died 29th day of disease
7	25096	♂	25	16	105–120=15	Positive (1–80) for B. typhosus (12th day of disease)	Negative	One test
8	24958	♂	30	29	82–114=32	Positive (1–80) for B. typhosus (9th day of disease)	Negative	One test
9	25691	♂	23	15 22 27	70–100=30 75– 92=17 96–120=24	Positive (1–80) for B. typhosus (18th day of disease)	Negative	
10	25119	♂	38	17	74– 88=14	Positive (1–80) for B. typhosus (14th day of disease)	Negative	One test
11	25653	♂	27	21 24 38 42	84–112=28 91–112=21 93–112=19 86–112=26	Positive (1–160) for B. typhosus (20th day of disease)	Negative	

BRITISH MEDICAL JOURNAL. 1918 Mar. 9. pp. 296-298. With 1 chart.—**Second Report of the Committee on Pyrexia of Unknown Origin and Trench Fever. The Diagnosis of P.U.O. from Enteric.**

Two hundred cases form the material of this Report. The clinical examination has been carried out by Captain Horsley DRUMMOND; the pathological work by Captain W. H. PERKINS Cultures were made from the blood in all cases admitted at a sufficiently early period of the disease, and while the patient remained in hospital, stools and urine were examined twice weekly. The agglutination titre was determined at least thrice, by DREYER'S method, in every case.

The diagnosis of enteric fever has been rendered more difficult by the introduction of prophylactic inoculations.

"1. Of 200 cases admitted under the diagnosis of P.U.O. or trench fever, 7 or 8 per cent. were proved on serological evidence to be enteric.

"2. While in hospital the clinical symptoms of these cases were no more distinctive of enteric than those of many others in which the serological evidence was negative."

J. H. T. W.

HORÁK (Ottokar). **Beobachtungen über Paratyphus A.** [Observations on Paratyphoid A.]—*Wien. Klin. Woch.* 1917. Sept. 6. Vol. 30. No. 36. pp. 1135–1137.

The author, a military surgeon, notes that owing to the movement of troops from one front to another paratyphoid A infection, rarely seen in Europe before 1914, is now a widely spread disease. In only 9·5 per cent. of the numerous cases was the bacillus found in the blood. The agglutination titre was as a rule low. The clinical features were those usually found and which have been previously described [see this *Bulletin*, Vol. 8, pp. 79–81; Vol. 9, pp. 472-473].

J. H. T. W.

SLUKA (Erich) & STRISOWER (Rudolf). **Der Paratyphus A an unserer Südwestfront (Tirol).** [Paratyphoid A on the South-West Front.] —*Münch. Med. Woch.* 1917. Sept. 25. Vol. 64. No. 39. pp. 1278–1281. With 2 charts.

After some introductory remarks concerning bowel diseases usually prevalent among troops in time of war the authors report that there were but few cases of typhoid fever up to the end of 1916.

"It was otherwise with *B. paratyphosus* B. In the early part of the year only sporadic cases appeared, but the infection appeared in epidemic form in July, August and September."

"Paratyphoid A epidemics were recorded on the East, West and Southeast fronts." The disease was introduced by enemy troops from the East and from North Africa. The course of an epidemic is described and the clinical and other features of paratyphoid A infection are discussed. The authors state that within their experience "the prognosis of paratyphoid A is not unfavourable and few complications occur." A few severe cases with high temperature, delirium and enlargement of the spleen were observed. "Among the 65 patients observed by us 10 died." All fatal cases were of the serious type.

With other observers of this disease the authors note that the agglutination titre is not very high and that " at the end of the first month of the illness and during convalescence there is a marked reduction of titre." [cf. Švestka: this *Bulletin*, Vol. 8, p. 99.]

J. H. T. W.

Etienne (G.). **Fièvres typhoïdes et paratyphoïdes A mixtes.**—*Bull. Acad. de Méd.* 1918. Jan. 29. 3 Ser. Vol. 79. Year 82. No. 4. pp. 86–89.

The author records cases of mixed infections:—

" I have lately observed three cases of this kind, by *B. typhosus* of Eberth and *B. paratyphosus* A; mixed infections from the beginning since blood culture has isolated the two elements, on the 5th day, the 6th day and the 11th day." These patients had not received any protective vaccine. The symptoms were very severe in two cases and severe in the third case.

As regards the evolution of agglutinins:—

" For *B. typhosus,* in the child of fourteen years, the sero-agglutination began with 1 in 40 on the 7th day, rose to 1 in 80 on the 12th day, then diminished, to rise again to 1 in 100 towards the end." This patient died.

" In the soldier agglutination appeared very slowly, reaching 1 in 20 only on the 32nd day, during convalescence it increased to 1 in 200, diminishing later on."

" In a woman, it was negative on the 9th day, 1 in 40 on the 11th day, 1 in 60 on the 14th day, then diminished."

" Agglutination for *B. paratyphosus* A was only obtained in one case ": the woman, towards the end of the disease, gave a fugitive reaction of 1 in 20, when the titre for *B. typhosus* was low. [cf. Castellani—this *Bulletin,* Vol. 6, p. 17.]

J. H. T. W.

Gildemeister (E.). **Ueber Dauerausscheider von Paratyphus B-Bacillen.** [Long Duration of Paratyphosus B Excretion.]—*Cent. f. Bakt.* 1. Abt. Orig. 1916. July 31. Vol. 78. No. 3. pp. 129-136. With 8 figs.

The author reports " two cases of patients who for long periods excreted *Paratyphosus* B bacilli; of these one is remarkable on account of the nature and site of elimination, the other on account of certain peculiarities which characterised the bacilli."

Case 1. [abridged]. W. G. S., aged 39; admitted to Posen Hospital October 6th, 1914, with an open sinus, right fore-arm. In 1903 suffered from typhoid fever; about 3 weeks before convalescence set in the man suddenly became paralysed over the whole of the right side; the skin was red and swollen; ten days later swellings appeared on the right forearm, and right leg just below the knee. Abcesses formed and were opened. The sore on the leg healed very slowly, the cavity in the arm closed and re-opened several times during several years. All signs of paralysis only disappeared six months ago. In September 1914 the man complained of pain in the joints of the right side and especially in the right arm. The discharge from the sinus was inoculated [streaks] into Conradi-Drigalski plates and *B. paratyphosus* B obtained. No typhoid bacilli were found.

The patient's serum agglutinated the bacilli from the cultures in a titre of 1 : 200. No bacilli were found in either urine or faeces. Dr. Gildemeister considers that this man had been excreting and spreading abroad *B. paratyphosus* B for 11 years.

Case 2. Reservist P. E., aged 24. Taken ill suddenly, with rigors and vertigo, pain in the chest and diarrhoea, November 21st, 1914. The stools at times contained blood. On Conradi-Drigalski plates *B. paratyphosus* B appeared in pure culture; but numerous similar experiments with faecal matter showed many atypical colonies of bacilli resembling in other characters the normal bacillus.

Investigations were made at intervals from December 1914 to May 6th (Table I) 1915, and similar results obtained throughout that period and were still present in 1916. The different forms of colony often occurred side by side on plates inoculated from the same stool."

J. H. T. W.

BANKS (H. Stanley) & EVANS (H. Roker). Thrombosis of Cerebral Arteries in Paratyphoid B Fever, occurring in a General Hospital in Salonika Army.—*Jl. Roy. Army Med. Corps.* 1918. Jan. Vol. 30. No. 1. pp. 100–101.

The authors, medical officers in the R.A.M.C., state that this case "presents two features of interest."

"It illustrates in the first place the severe toxaemic form which this usually mild fever occasionally assumes, and in this connexion we may remark that our patient had not been inoculated against paratyphoid A and B. In the second place, it furnishes another example of arterial thrombosis complicating the disease—a complication which has been rarely noted even in typhoid fever, and which, apart from Macadam's case, has not, so far as we are aware, been described in connexion with paratyphoid fever."

The patient, an officer aged 21, was admitted on December 6th, 1916, on the third day of illness. Symptoms: shivering, headache and diarrhoea. Temp. 104·8° F.; it remained high and continuous. On the fourth day blood for culture yielded *B. paratyphosus* B. On the sixth day:—"delirium, furred and very dry tongue, and a large crop of small rose spots present all over the trunk." On the twelfth day: "unconscious and was then found to have a complete right-sided hemiplegia. . . . death took place forty-eight hours later, the temperature rising to 106° F. before death."

"The left internal carotid artery was thrombosed where it entered the skull, and the thrombosis extended to the anterior and middle cerebral arteries. . . . The anterior cerebral was thrombosed in the first half-inch of its course, and beyond this the vessel and its branches were collapsed. The middle cerebral was completely thrombosed throughout its course in the Sylvian fissure and the thrombosis involved both its basal and its cortical sets of branches." Full details of the autopsy are recorded. [cf. MACADAM—this *Bulletin*, Vol. 9, p. 20.]

J. H. T. W.

GAY (Frederick P.). Further Experience in the Treatment of Typhoid Fever by the Intravenous Injection of Sensitized Typhoid Vaccine Sediment.—*Jl. Lab. & Clin. Med.* 1917. Aug. Vol. 2. No. 11. pp. 785–803. With 3 figs.

"This article records our experience in the treatment of ninety-eight authenticated cases of typhoid fever over a period of two and one-half years by the intravenous injection of a polyvalent sensitized typhoid vaccine sediment (Gay-Claypole vaccine)....We regard the treatment as indicated in any case of typhoid fever that is still febrile, on the basis of our results which seem excellent. The mortality in these cases was low (6·6 per cent.) and the complications few. Relapses were distinctly reduced in those cases in which the intravenous injections were followed by a series of three subcutaneous inoculations after the temperature had reached normal. . . .

"The usual amount on initial injection has been 1/50 of a milligram (corresponding to 150 million bacteria), and a corresponding dose in children, who, as in prophylactic immunization against typhoid. react less markedly than adults to corresponding amounts. . . .

"In one-third of the cases the temperature fell critically following the first or second injection, and a permanent normal was established on the average within a week after beginning treatment."

A comprehensive bibliography is given.

J. H. T. W.

DIACONO (Hector). **La typho-uro-réaction. Nouvelle méthode de diagnostic urologique de la fièvre typhoïde.**—*Presse Méd.* 1917. Oct. 22. Vol. 25. No. 59. pp. 611–612. *Arch. Inst. Pasteur de Tunis.* 1917. Oct. Vol. 10. No. 1–2. pp. 82–87.

The author says of *B. typhosus* :—

"The agglutinable and precipitable elements of the antigen, arrived at the level of the renal glomerulus may, *in part*, pass through it by incomplete filtration before it has been submitted to the digestive action of the bacteriolysins.

"The hypothesis of an incomplete renal filtration in the case of infection with Eberth's bacillus is founded upon the frequent observation in the urine of typhoid cases of bacilluria, upon the normal retention of chlorides, the almost constant presence of pathological albumin from a chemical point of view and of renal cylinder casts from the microscopic point of view.

"In the method of Bormans and Beniasch the urine acts as an antiserum ; in my method the antiserum is added to the urine."

Technique :—"According to the experiments of Joos chloride of sodium is absolutely necessary for the production of the phenomena of agglutination."

The required amount of chlorides in the urine, expressed as NaCl, is from 7·0 to 8·0 grammes per litre. The urine for 24 hours is collected. If clear it can be used at once ; if turbid it should be allowed to settle and the clear fluid can be used. The amount of chloride is estimated. If less than 8·0 gm. per litre, NaCl must be added.

The test serum used would agglutinate *B. typhosus* in a titre of 1 : 10,000.

The serum before addition to the urine is " diluted to one fifth with physiological salt solution."

	Urine.	Agglutinating serum diluted to 1/5.
(a)		
Tube 1.	20 cc.	0·5 cc.
,, 2.	20·5 cc.	nil (control)
,, 3.	20·0 cc. urine of healthy man	0·5 cc. (control)

"If the test is positive tube No. 1 will show, after resting in the incubator, at 37° C., for three or four hours, a characteristic flocculent deposit; tubes 2 and 3 (control tubes) will not show any change."

(b) Showing sensibility of the reaction :—

		Urine.	Agglutinating serum diluted 1/5.	
Tube	1.	20 cc.	+1·0 cc.	
,,	2.	,, ,, ...	0·75 ,,	
,,	3.	,, ,, ...	0·5 ,,	
,,	4.	,, ,, ...	0·4 ,,	
,,	5.	,, ,, ...	0·3 ,,	
,,	6	,, ,, ...	0·2 ,,	
,,	7	,, ,, ...	0·1 ,,	
,,	8	,, ,, ...	nil	(control)
,,	9	,, ,, urine of healthy man ..	1·0 cc	(control)

Placed as before in incubator for three or four hours at 37° C. the tubes 1 to 7 show a flocculent deposit decreasing in amount from tube 1 to tube 7. The control tubes 8 and 9 remain without deposit.

The author claims that this reaction appears early, before the serum-reaction of Widal and before the presence of indol is shown by the "diazo" test. He further states that he has tested urine from other diseases and without getting the characteristic deposit.

J. H. T. W.

NICOLLE, RAPHAEL (A.) & DEBAINS (E.). **Etudes sur le bacille d'Eberth et les bacilles paratyphiques.**—*Ann. Inst. Pasteur.* 1917. Aug. Vol. 31 No. 8. pp. 373–402.

The authors divide their work into two sections. The first portion dealing with 70 specimens, mostly obtained by blood-culture from patients during the course of the "fever," describes: Morphological characters; negative and positive reactions in various media and passage by sub-culture in Frankel's fluid.

The second section contains results of agglutination experiments. In both sections the authors record the finding of abnormal bacilli [cf. SARRAILHÉ & CLUNET ; SVESTKA ; ARCHIBALD, HADFIELD, etc., this *Bulletin*, Vol. 8, pp. 73 & 89; also COURMONT, CHATTOT & PIERRETT, ARCHIBALD, HADFIELD, etc., Vol. 9, pp. 14 & 1–4].

The results of work recorded in the first section are brought together in the "Table" on opposite page.

The milk used was fresh and not skimmed.

The formula for Fränkel's fluid is :—

Sodium chloride	5 gm.
Bipotassic phosphate	2 ,,
Asparagin	4 ,,
Ammonium lactate	6 ,,
Distilled water	1,000 ,,

Tubes were inoculated with one drop of a broth culture and then again subcultured by inoculation of tube No. 2 from No. 1. Of this method the authors write :—

"The essential fact is the possibility or impossibility of obtaining a development in the second Fränkel tube."

J. H. T. W.

	Liquide Frankel	Gélose au sous-acétate de plomb	Gélose au rouge neutre	Eau peptonée et glucosée	Petit-lait tournesolé	Lait tournesolé
Bacilles typhiques. [Nos : 2, 9, 10, 11, 12, 13, 16, 17, 18, 20, 30, 35, 36, 37, 38, 48, 58, 61, 63, 68.]	*Absence de passages.*	*Strie noire.* Milieu non modifié en général.	*Pas de virage.* *Pas de fluorescence.*	*Pas de gaz*	*Acidification légère, puis retour à la teinte sensible.* *Pas de voile.* (Dans un seul cas, No. 11, réduction).	*Acidification légère, puis retour à la teinte sensible.* *Pas de bleuissement de la surface.*
Bacilles paratyphiques A. [Nos : 22, 23, 56, 59, 66, 67, 69, 70, 71.]	*Absence de passages.*	Strie blanche ou strie grise étroite après 24 heures. *Donc : production d'H^2S nulle ou pratiquement nulle.*	*Virage et fluorescence* constants, mais réaction souvent incomplète après 48 heures.	*Gaz.*	*Acidification légère, persistante ou suivie d'un retour à la teinte sensible.* Parfois, tout s'arrête rapidement à cette teinte. *Pas de voile.*	*Acidification légère. s'écartant peu de la teinte sensible.* *Pas de bleuissement de la surface.*
Bacilles paratyphiques B. [Nos : 1, 3, 4, 8, 14, 15, 19, 25, 26, 31, 32, 57, 60, 64 65, 80.]	*Passages.*	*Strie noire* intense. Généralement diffusion dans le milieu.	*Virage et fluorescence* constants ; d'ordinaire complets après 48 heures	*Gaz.*	*Virage au bleu*, inconstamment précédé d'acidification, inconstamment suivi de réduction. Parfois, acidification légère, immédiatement suivie de réduction. *Voile bleu*, après 24—48 heures.	*Acidification légère peu durable puis, virage au bleu* de plus en plus intense. Ce virage est précédé, dans la majorité des cas, d'une phase de réduction (décoloration du milieu). *Bleuissement de la surface.*

MACKIE (T. J.). **The Brilliant Green Enrichment Method for the Isolation of the Paratyphoid Bacilli from Faeces.** *Jl. Roy. Army Med. Corps.* 1917. Oct. Vol. 29. No. 4. pp. 457–462.

The author gives in detail a series of plating experiments showing the usefulness of Brilliant Green with MacConkey's medium for the culture of paratyphoid bacilli.

"As will be seen from these examples the optimum amount of brilliant green necessary to elicit the maximum growth of the typhoidal bacilli varies with each specimen of faeces though lying within a certain range, i.e., from 0·25 cubic centimetre to 0·7 cubic centimetre of a 1 in 10,000 solution, and the resulting bacterial growth may be completely altered by even slight variations in the amount of the reagent used."

References to other papers are given [cf. also: TIDY & DUNN, this *Bulletin*, Vol. 9, p. 19].

J. H. T. W.

HULTON-FRANKEL (Florence) & MACDONALD (Katherine). **Differentiation of Typhoid, Paratyphoid A and B by Means of a Dextrin-Inosite Medium.**—*Proc. Soc. Experim. Biol. & Med.* 1917. Dec. 19. Vol. 15. No. 3. p. 31.

(From Harriman Research Laboratory, Roosevelt Hospital, New York.)

The medium consists of 3 per cent. agar containing 1 per cent. inosite and 1 per cent. dextrin, using litmus as an indicator. The dextrin must be one of the lower dextrins.

B. typhosus ferments the dextrin with acid formation in the butt of the tube, decolorizing entirely in 24 hours, with a violet slant.

B. paratyphosus A does not ferment either dextrin or inosite; the butt and the slant of the tube remain violet in colour.

B. paratyphosus B ferments the inosite with gas formation; decolorizes the butt of the tube with the formation of gas bubbles; the slant remains violet.

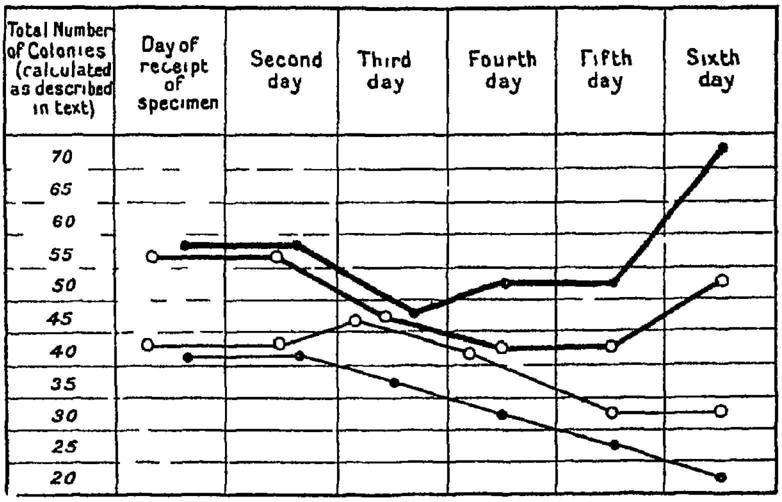
J. H. T. W.

BENIANS (T. H. C.). **The Preservation of Typhoid and Paratyphoid Bacilli in Stools by Emulsifying in Glycerine.**—*Lancet.* 1918. Feb. 16. pp. 255–256. With 2 charts.

"Teague and Clurman [*Jl. Infect. Dis.* 1916. June. pp. 653–671] have shown that by emulsifying infected stools in 30 per cent. glycerine the typhoid bacillus can be kept living, and can be isolated, for some length of time after it has died out from a control specimen emulsified in saline." The author has extended the research to include the paratyphoid bacilli. "A small amount of faecal material from each case, about 5 gr." was placed in each of two 20 cc. glass pots. To one was added 10 cc. of 30 per cent. glycerine diluted in 0·6 saline; to the other 10 cc. of the saline only. The faeces were emulsified by stirring up in the fluids. Daily platings from the specimens were made with a measured quantity of the supernatant fluid spread evenly on a well dried McConkey plate; one plate for each specimen. The specimens were kept on the bench at laboratory temperature, approximately 16° C., and results were observed after 24 hours incubation. The number of colonies on each plate was then calculated.

Chart 1 shows that the coliform organisms are kept in check whilst the non-lactose fermenters are, to a large extent, preserved in the glycerine emulsion. In the saline emulsions the reverse is the case, the non-lactose fermenters dying out, the coliform bacilli rapidly increasing, especially on the fifth and sixth days. At summer temperatures this increase is more rapid than at winter temperatures.

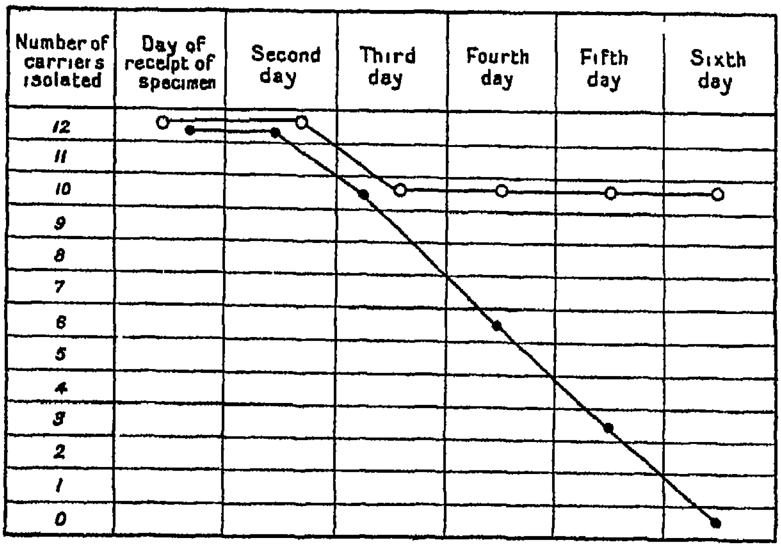
Chart 1.*



Showing total daily number (as calculated) of both red and white colonies from glycerine and saline faecal emulsions in 18 cases.

Lactose fermenters.
Non-lactose fermenters.
Glycerine emulsions (with circle).
Saline emulsions (with dot).

Chart 2.*



Showing number of carriers from whom the pathogenic organisms were isolated each day, from both glycerine and saline emulsions.

[* Reproduced by permission from the *Lancet.*]

Chart 2 shows the rapid disappearance of the pathogenic bacteria from the saline emulsions and preservation of *Enterica* bacilli in glycerine emulsions.

J. H. T. W.

Hooker (Sanford B.). **A Comparison of the Antigenic Properties of Different Strains of** *Bacillus typhosus.*—*Jl. Immunology.* 1916. Dec. Vol. 2. No. 1. 22 pp.

This report from the Hearst Laboratory of Pathology and Bacteriology, University of California, emphasizes the importance of variation. It is not easy to condense, but the "Summary" will give a sufficient idea of the author's work and results :—

"By means of the alexin-fixation reaction it has been found possible to demonstrate consistent antigenic differences among some strains of *B. typhosus.* In accordance with these differences a number of strains have been tentatively allocated in three fairly well-defined groups. Group I is made up of strains of rather recent isolation; no strain in this group has been under artificial cultivation for more than two years. Older strains, isolated from three to fifteen years ago, compose Group II. The third group is made up of those strains that fall neither in Groups I nor II, and that cross-fix irregularly with each other and with members of the other groups. Group III strains are all more than three years old.

"By means of agglutinin-absorption experiments, findings have been obtained that, in general, harmonize strikingly with the results of cross-fixation. This confirmatory evidence, secured by a widely different serologic method, tends strongly to prove that these antigenic differences among typhoid strains, as demonstrated by alexin-fixation, represent an actual condition and are not fortuitous. . .

"The facts that a serum immune to any recently isolated strain cross-fixes with all other strains, old or young, while sera immune to older strains do not so cross-fix, would lead to the seemingly justified assumption that only do the young strains contain all of the antigenic complexes of typhoid bacillary protein. The logical conclusion, then, would be that a young strain ought to afford the most efficient protection when used for prophylactic immunization against typhoid fever. However, the results of the work on agglutinin-absorption, if correctly interpreted, do not warrant the assumption that a univalent [one strain only] vaccine is sufficient. . . . . It seems advisable, for the present, to recommend the use of a balanced polyvalent typhoid vaccine, for immunizing and therapeutic purposes, compounded in accordance with these groups."

[Compare the physiological variation of *Meningococcus Wechselbaumi* which makes the use of at least four varieties necessary in preparing a useful "anti-serum" for cerebro-spinal meningitis.]

J. H. T. W.

Garrow (R. P.). **Studies in Agglutination.**—*Jl. Roy. Army Med. Corps.* 1917. Oct. Vol. 29. No. 4. pp. 412–438. With 3 charts.

The following extracts, charts and "tables" from this long and carefully written paper will give some idea of its value. The work was done in the Military Hospital, Malta.

Captain Garrow, R.A.M.C, records :—

I. The course of agglutinin production, after protective typhoid inoculation, in 204 healthy persons, officers, nurses, N.C.O.'s and privates. Four are omitted from the charts, etc., as they failed to show "T–agglutination in titre of 1 in 10 or upwards."

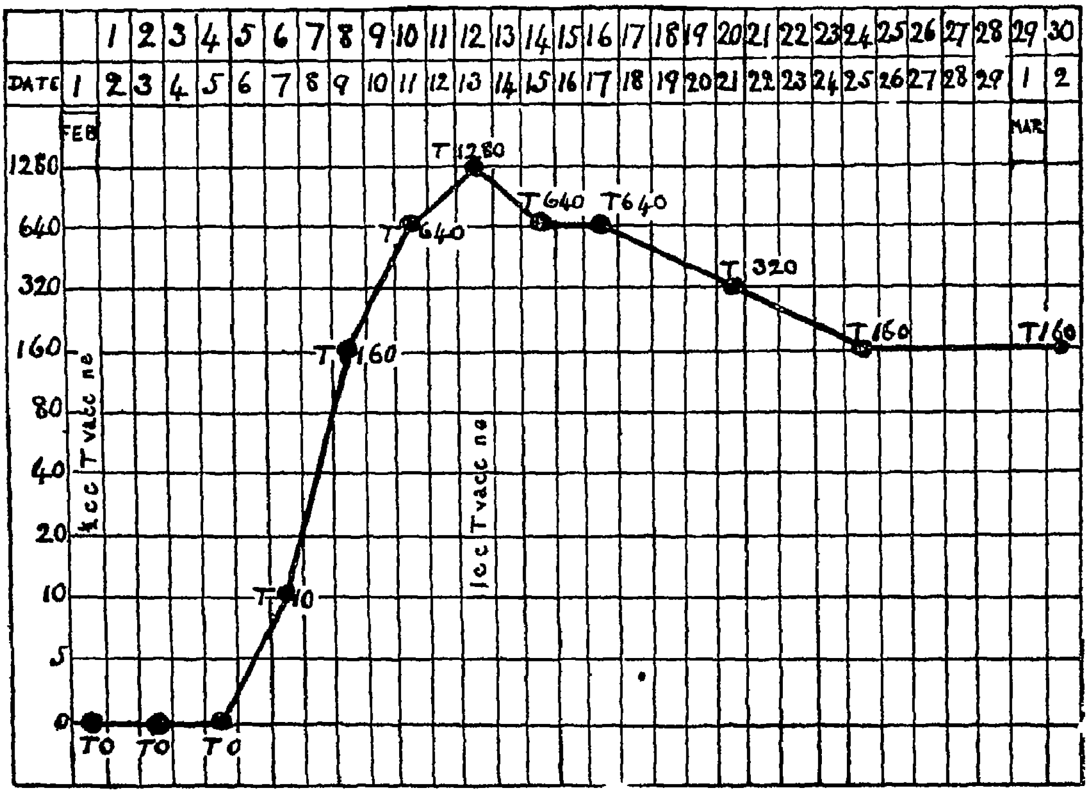


CHART I —Agglutinogram showing the T inoculation agglutinin titres obtained by repeated examinations of the blood of an individual for one month after T inoculation The examinations were made by means of the clinical agglutinometer No agglutinins for A or B were detected in dilution of 1 in 10 or upwards

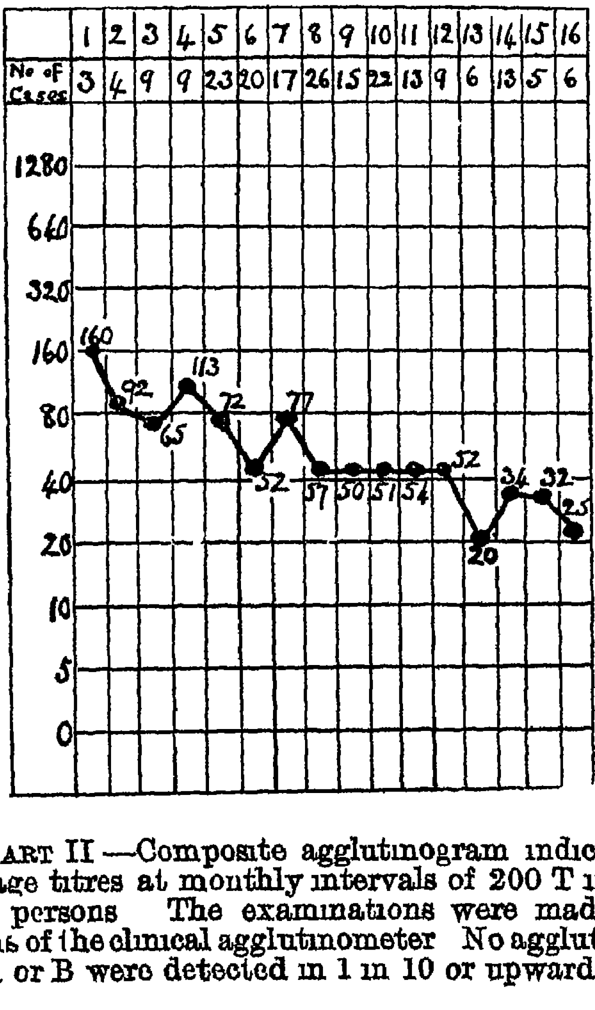


CHART II —Composite agglutinogram indicating average titres at monthly intervals of 200 T inoculated persons The examinations were made by means of the clinical agglutinometer No agglutinins for A or B were detected in 1 in 10 or upwards

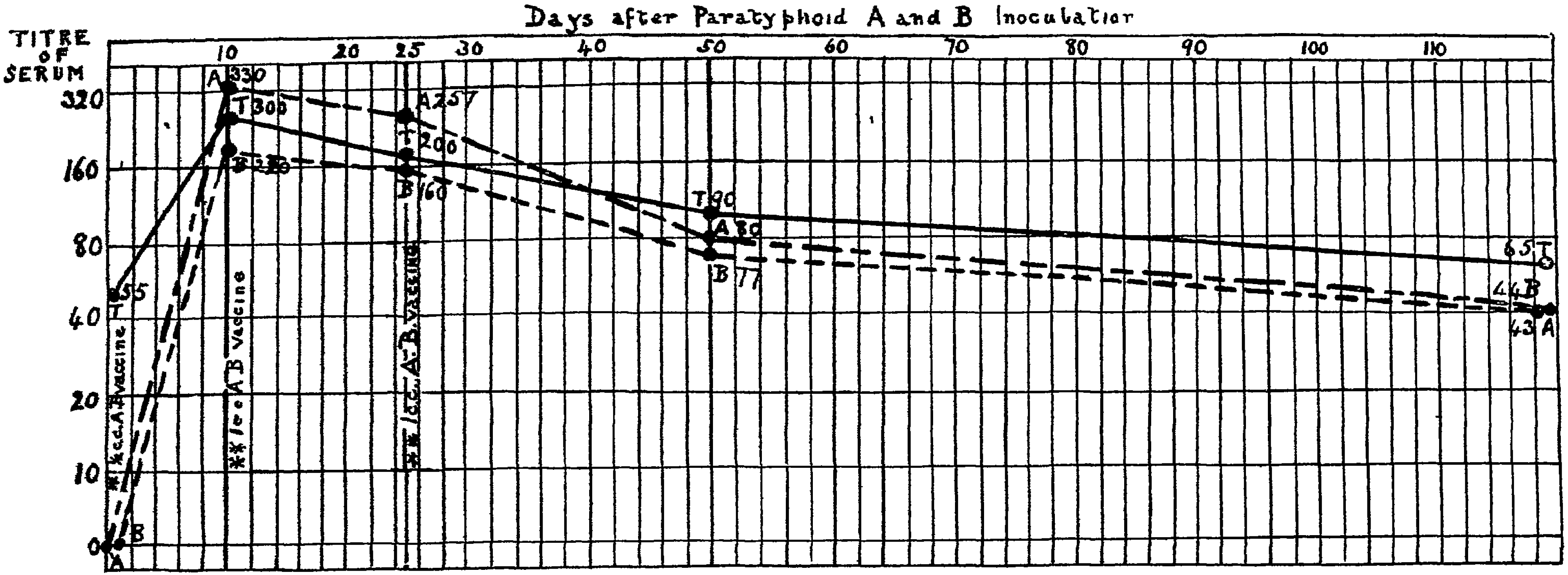


CHART III.—Shows the average course of agglutination after paratyphoid A and B inoculation in 100 persons who were previously inoculated against typhoid fever.

[Charts I, II and III reproduced by permission from the *Journal of the Royal Army Medical Corps.*

"These two charts read together, show clearly the five phases in the agglutinin response to antityphoid inoculation, viz. :—

"(a) A latent period of four or five days, during which time no agglutinin was detected in dilution of 1 in 10 or higher.

"(b) A period of rapidly rising titre setting in about the fifth or sixth day, and lasting till the twelfth day.

"(c) A maximum agglutinin titre reached on the twelfth day after inoculation.

"(d) A period of rapidly falling titre lasting from the twelfth day till about the twenty-fourth day.

"(e) *A period of residual agglutinin* commencing about the twenty-fourth day after inoculation, and lasting until the inoculation agglutinin finally disappears entirely from the blood."

TABLE III.

	Number of cases	Average agglutinin titre	Average time in months after inoculation
Local reaction			
Mild	159	60	8 months.
Moderate ..	26	75	8 „
Severe	15	43	9 „
General reaction			
None	46	60	7 to 8 months.
Mild	116	60	8 to 9 „
Moderate ..	25	70	7 to 8 „
Severe	13	52	9 months.

"Table III shows that a moderate degree of reaction (local or general) produces a higher average residual agglutinin titre at eight months after inoculation than does a mild degree of reaction. A severe reaction, however, is followed by a lower average residual titre."

TABLE IV.

Agglutinin titres.	Months after Inoculation.																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total cases.
1 in 320 ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1 in 160 ..	3	2	2	5	4	1	5	3	1	1	1	1	0	0	0	0	29
1 in 80 ..	0	0	1	2	8	6	3	5	3	5	3	1	0	2	0	0	39
1 in 40 ..	0	1	4	1	8	8	6	13	7	12	7	5	1	5	3	2	83
1 in 20 ..	0	0	1	1	2	3	1	3	2	4	1	1	3	3	2	3	30
1 in 10 ..	0	1	1	0	1	2	2	2	2	0	1	1	2	3	0	1	19
Total cases ..	3	4	9	9	23	20	17	26	15	22	13	9	6	13	5	6	200
Average titres	160	92	65	113	72	52	77	57	50	51	54	52	20	34	32	25	

"In Table IV, the 200 cases are arranged into sixteen monthly groups, according to the time that elapsed between inoculation and examination."

[This "table" agrees with the findings of other investigators.]

II.—Paratyphoid inoculation in Typhoid-Inoculated Individuals.

"R.A.M.C. paratyphoid vaccine :—

"1 cc. contains Para A ....500 millions
Para B ....500 „
"1st dose for an Adult, ½ cc. or 9 min.
"2nd dose „ „ „ 1 cc. or 18 min."

"The object of this study was to obtain information which might be of value in the interpretation of agglutination results in cases of supposed enterica occurring in patients who had been inoculated against all three diseases."

TABLE I.

Indicating the "T" Inoculation Agglutinin Titres at Various Stages after Paratyphoid Inoculation.

"T" Agglutinin titre	Days after paratyphoid inoculation			
	0	10	25	50
0	1 case	1 case	1 case	1 case
10	9 cases	0 ,,	0 ,,	2 cases
20	17 ,,	4 cases	5 cases	7 ,,
40	42 ,,	3 ,,	7 ,,	31 ,,
80	19 ,,	16 ,,	16 ,,	27 ,,
160	12 ,,	38 ,,	40 ,,	24 ,,
320	0 case	17 ,,	20 ,,	3 ,,
640	0 ,,	17 ,,	8 ,,	0 case
1,280	0 ,,	2 ,,	0 case	0 ,,
Totals	100 cases	98 cases	97 cases	95 cases

TABLE II.

Indicating the "A" Agglutinin Titres at Various Stages after Paratyphoid Inoculation.

"A" Agglutinin titre	Days after paratyphoid inoculation			
	0	10	25	50
0	100 cases	0 case	1 case	3 cases
10	0 case	2 cases	0 ,,	1 ,,
20	0 ,,	1 case	1 ,,	10 ,,
40	0 ,,	10 cases	8 cases	35 ,,
80	0 ,,	11 ,,	20 ,,	21 ,,
160	0 ,,	22 ,,	20 ,,	18 ,,
320	0 ,,	25 ,,	31 ,,	4 ,,
640	0 ,,	24 ,,	15 ,,	0 case
1,280	0 ,,	1 case	1 case	0 ,
2,560	0 ,,	2 cases	0 ,,	0 ,,
Totals	100 cases	98 cases	97 cases	95 cases

TABLE III.

Indicating the "B" Agglutinin Titres at Various Stages after Paratyphoid Inoculation.

"B" Agglutinin titres	Days after paratyphoid inoculation			
	0	10	25	50
0	100 cases	3 cases	1 case	2 cases
10	0 case	1 case	2 cases	4 ,,
20	0 ,,	3 cases	2 ,,	9 ,,
40	0 ,,	5 ,,	7 ,,	35 ,,
80	0 ,,	20 ,,	31 ,,	26 ,,
160	0 ,,	33 ,,	35 ,,	16 ,,
320	0 ,,	23 ,,	15 ,,	3 ,,
640	0 ,,	9 ,,	4 ,,	0 case
1,280	0 ,,	1 case	0 ,,	0 ,,
Totals	100 cases	98 cases	97 cases	95 cases

The value of agglutination as diagnostic of enteric fever is considered in each section and the author insists upon "*the necessity for an intelligent interpretation of agglutinin results in conjunction with clinical facts.*"

J. H. T. W.

TAYLOR (Frank E.). **Castellani's Absorption Test: Its Technique and Applications.**—*Jl. Trop. Med. & Hyg.* 1918. Feb. 15. Vol. 21. No. 4. pp. 37–38.

This report is based on the author's " own experience and that of other workers."

" Having discovered this method of distinguishing between specific agglutinins and non-specific agglutinins, CASTELLANI [*Zeit. für Hygiene*, 1902] applied it to: (1) the diagnosis of mixed infections; (2) the differentiation of closely allied bacterial species and types." The details, somewhat condensed, are as follows:—

Technique of the Absorption Test.

Let us suppose we have a paratyphoid B serum agglutinating powerfully both the *B. paratyphosus* B and *B. aertryke*, the agglutination titre for both organisms being > 1 in 10,000.

(1) Dilute the serum with normal saline so as to have a 1 in 50 dilution (0·1 cc. serum plus 4·9 cc. normal saline); put 2·5 cc. of the diluted serum in a sterile centrifuge tube, " Tube No. 1." Put the same amount (2·5 cc.) in another centrifuge tube, " Tube No. 2."

(2) Scrape off with a platinum wire the growth of four or five agar slope cultures of *B. paratyphosus* B and add it to No. 1 tube. Do not wash off the growth with the diluted serum.

(3) [Repeat] with cultures of *B. aertryke* and add to No. 2 tube.

(4) Incubate both tubes at 37° C. for two hours, centrifuge until all bacilli are precipitated and the supernatant fluids are clear.

(5) Pipette off fluids into two sterile tubes, and test agglutinating action of both fluids up to a dilution of 1 in 10,000 against *B. paratyphosus* B and *B. aertryke*, remembering, that the serum is already diluted 1 in 50.

After absorption with *B. paratyphosus* B the titre for both organisms will be practically *nil*, or nearly so, (<400). After absorption with the *B. aertryke* the titre for this bacillus will be practically *nil*, or nearly so, (<400) while the titre for the paratyphoid " B " bacillus will be unchanged, or only slightly lessened.

The Diagnosis of Mixed Infections.

The blood of a non-inoculated patient suspected to be suffering from enteric is found to contain a fairly large amount of agglutinins for *B. typhosus* and *B. paratyphosus* B. Is it a case of mixed infection typhoid-paratyphoid B ? Or is it a case of typhoid with secondary non-specific agglutinins for *B. paratyphosus* B ? Or a case of paratyphoid B with secondary non-specific agglutinins for *B. typhosus* ?

(1) After saturation with *B. typhosus* the typhoid agglutinins and the paratyphoid agglutinin have disappeared, or nearly so; after saturation with *B. paratyphosus* B the paratyphoid agglutinin has disappeared, or nearly so, while the typhoid agglutinin remains the same amount. These results show that the typhoid agglutinin is the specific one and the case one of typhoid with coagglutinins for *B. paratyphosus* B.

(2) After saturation with *B. typhosus* the typhoid agglutinin has disappeared, or nearly so, while the paratyphoid B agglutinin remains in the same amount. After saturation with *B. paratyphosus* B, both the paratyphoid and the typhoid agglutinins have disappeared. These results mean that the paratyphoid B agglutinin is the specific one.

(3) After saturation with *B. typhosus* the typhoid agglutinin has disappeared while the paratyphoid B agglutinin remains. After saturation with *B. paratyphosus* B the typhoid agglutinin remains unchanged. The results show that both the typhoid and paratyphoid agglutinins present are specific and the case one of mixed infection.

Diagnosis of Closely allied Bacterial Species and Types.

Suppose we have isolated a bacillus with cultural and biochemical characters of *B. paratyphosus* B, well agglutinated by a paratyphoid B serum. Is it *B. paratyphosus* B, or is it *B. aertryke* ? CASTELLANI'S method gives the answer as shown by the work of Boycott, Bainbridge, and O'Brien. If the bacillus is really *B. paratyphosus* B, paratyphoid B serum saturated with the organism we have isolated will lose completely, or nearly, its agglutinin for *B. paratyphosus* B and also its agglutinin for *B. aertryke*. If the germ is *B. aertryke* then paratyphoid B serum when saturated with the isolated bacillus will lose its agglutinating power for *B. aertryke*, but will not lose its agglutinating power for *B. paratyphosus* B.

J. H. T. W.

Ecker (E. E.). **The Pathogenic Effect and Nature of a Toxin produced by *B. paratyphosus* B.**—*Jl. Infect. Dis.* 1917. Dec. Vol. 21. No. 6. pp. 541–553.

"This paper presents the results of experiments which indicate the production of soluble toxins by *B. paratyphosus* B and make it probable that it is to these particular toxins that the bacillus owes its disease-producing power."

As the result of experiments on rabbits with filtered toxins the author concludes that :—

"In broth cultures soluble toxic substances are produced within 24 hours by some strains of *B. paratyphosus* B."

These toxic substances produce constant pathologic effects and are of the nature of true soluble toxins inasmuch as they stimulate the formation of antitoxins.

The toxic substances are comparatively thermostabile since they resist boiling for 5 minutes at 100° C.

From the "table" of results "it appears that a toxic filtrate may be obtained from strains of *B. paratyphosus* B in general when the organisms have been grown in a suitable broth for 8- 14 days at 37° C. and that the toxicity is not that of the peptone constituent as such. Cultures in peptone-free mediums did not produce toxic substances. The controls show however, that when upward of 5 per cent. peptone is used in the culture medium the toxicity of this substance becomes a complicating factor, as was undoubtedly the case in much previous work."

J. H. T. W.

i. Force (John N.) & Stevens (Ida M.). **Further Studies on Typhoidin.**—*Arch. Intern. Med.* 1917. Mar. Vol. 19. No. 3. pp. 440–456.

ii. Gay (Frederick P.) & Lamb (Albert R.). **The Application of the Typhoidin Test in a Group of Nurses and Physicians.**—*Jl. Lab. & Clin. Med.* 1917. Jan. Vol. 2. No. 4. pp. 217–221.

These two records refer to the production of a skin reaction indicative of immunity against typhoid fever. "Typhoidin" is injected intra-(not sub-)cutaneously as with Luetin in the Noguchi reaction.

i. "The original typhoidin employed by Gay and Force consisted of a ten-day culture of a single strain of *Bacillus typhosus* on glycerin broth evaporated to one-tenth volume. On account of deterioration of the preparation in this form, Gay and Claypole precipitated the original typhoidin with twenty volumes of alcohol, filtered, washed with absolute alcohol and ether, and then dried on porcelain plates over sulphuric acid in a vacuum. With a freshly prepared suspension of this typhoidin powder in phenolated saline, equivalent in concentration to the original typhoidin, these authors were able to produce marked intradermal reactions in previously immunized rabbits, but not in controls. The reaction was characterized by the appearance within twenty-four hours of an indurated, reddened papule, which persisted at the site of inoculation for several days. . . . Positive results were secured in ten typhoid cases out of thirteen by a similar injection of Gay-Claypole vaccine, representing a suspension of 0·1 mg. (800 million) dried and ground sensitized typhoid organisms to 1 cc. A red maculopapule appearing at the site between six and forty-eight hours after inoculation was considered positive if it equalled in size the original weal produced by the intradermal injection. . . .

"Out of 108 positive reactions [with a polyvalent typhoidin] the forty-eight hour papule measured 10 mm. or over in twenty-six instances; the average measurement of 108 papules was 8·4 mm."

With an improved vaccine :—

"Out of eighteen normal persons, seventeen gave negative reactions; out of twenty-six persons with a history of typhoid, nineteen gave positive reactions, one gave a doubtful, and six persons (four with questionable typhoid histories) gave negative reactions. Out of 152 persons previously vaccinated against typhoid, twelve of fifty-six vaccinated during 1916, three of eleven vaccinated during 1915, thirteen of twenty-nine vaccinated during 1914, and twenty-six of fifty-two vaccinated during 1913 gave negative reactions."

ii. The vaccine employed was that of FORCE and STEVENS and used by them in procuring the above results, "a polyvalent preparation from several chosen strains of typhoid bacilli . . . a carefully determined minimal effective dose of the dried polyvalent typhoidin (0·00002 gm. in 0·05 cc. of 0·5 per cent. carbolated saline).

"At all events, whatever may be the eventual understanding of a positive typhoidin test, use of its absence as an indication for re-vaccination certainly errs on the side of safety in detecting those individuals who in spite of typhoid vaccination do not show indications of a reaction to the typhoid bacillus, and who are, therefore, presumptively those particular individuals who under ordinary conditions of infection will be found to be the least protected ones."

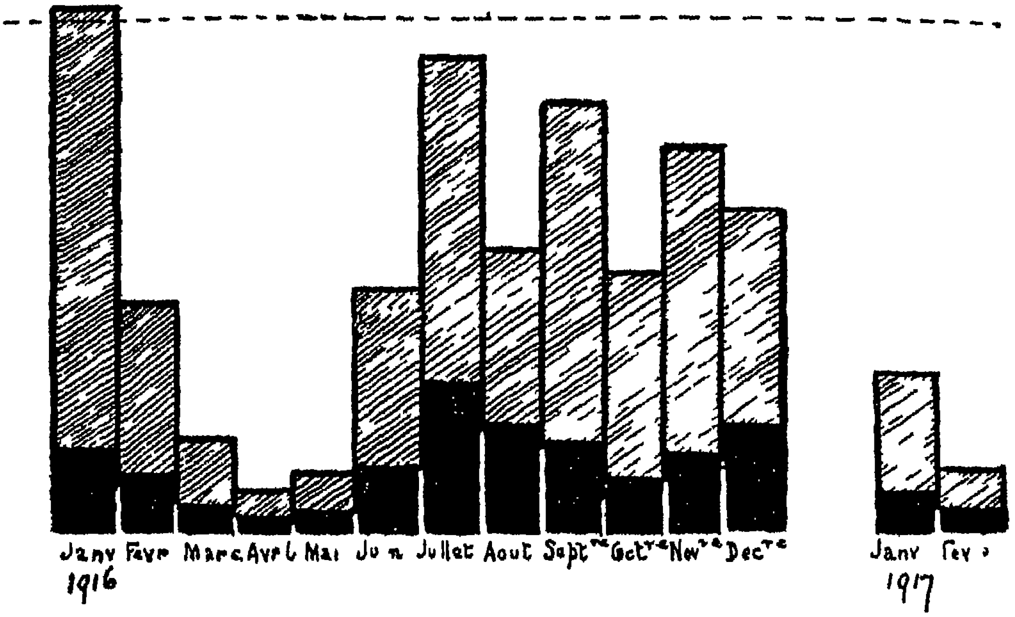
With each paper a bibliography is supplied.

J. H. T. W.

ARMAND-DELILLE (P.), PAISSEAU (G.) & LEMAIRE (H.). **Rôle de la vaccination antityphoïdique et antiparatyphoïdique dans la disparition presque complète des affections typhoïdes et paratyphoïdes à l'armée d'Orient.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. July 12. 3 Ser. Year 33. No. 23–24. pp. 854–857. With 1 diagram.

"Antityphoid vaccination, at first alone, afterwards combined with antiparatyphoid vaccination . . . has produced, among the troops of the Army of the East, in spite of the defective hygienic conditions in which it was placed, results truly perfect. We insist only on two points in particular; first of all the limitation of typhoid almost exclusively to the non-vaccinated, secondly to the disappearance, almost complete, of paratyphoid, after re-vaccination with T A B vaccines."

The paragraph just quoted gives the value of the work which the authors describe in detail Mixed vaccination was not thoroughly applied till the end of 1916



Number of typhoid and paratyphoid cases observed in the Eastern Army, from January 1916 to February 1917, per mille [Black—typhoid Hatching—Paratyphoid.]

[Reproduced by permission from the *Bulletins et Mémoires de la Société Médicale des Hopitaux de Paris*]

In the authors' own words —" The figures speak for themselves "

J H T. W

Dreyer (Georges), **Gardner** (A Duncan), **Gibson** (Alex G) & **Walker** (E W Ainley) **Prophylactic Triple Inoculation against Typhoid and Paratyphoid Fevers.**—*Lancet* 1918 Apr 6 pp 498–500

The main conclusions are —

> " A most important factor affecting duration of immunity is the *time interval allowed between the first and second inoculation* The length of this interval also strikingly influences the more immediate effect of the administration of a second dose of vaccine . . .
>
> " *A more lasting immunity is obtained by administering it at a time when the effect of the first has reached* (*approximately*) *its maximum* [as shown by the " curve "] . .
>
> " We are therefore of opinion that *it would prove advantageous to lengthen the interval between the first and second dose of vaccine from 10 days to 18 or 20 days* "

J. H. T. W.

i. **Takano** (R) **[Typhoid Immunisation involving the Entire Population of Lasa, Loochoo Islands.]**—*Saikingaku Zasshi* (*Jl Bacteriol*). 1917 Jan. 15 No 256 pp 15–24

ii. **Toyoda** (S) **[Enrichment Method for demonstrating the Presence of Typhoid Bacilli in Contaminated Water.]**—*Ibid.* May 15. No. 260. pp. 391–402.

iii. SAKAGAMI (K.). **[Bacteriocidal Action of Normal Serum against Paratyphoid Bacilli.]**—*Ibid.* June 10. No. 261. p. 510.

[From Reviews by R. G. MILLS.]

i. The island of Lasa is a small rocky portion of the Loochoo islands which was uninhabited until a phosphate mining company imported about 1,500 laborers for the purpose of commercial exploitation. Living conditions were bad owing to poor water supply and an ever increasing mortality from typhoid caused the authorities much concern. The author was called upon to immunize the entire population of the island in an attempt to stamp out the epidemic. One cc. of a sensitized vaccine a month old prepared by the Kitasato Research Dept. was used for each patient. In all 1,290 people were treated, 9 developed the disease within a few days of the injection of whom one died, and 2 light cases broke out 2–3 months after immunization. The reactions noted were all mild in character, 484 patients reaching a temperature of 38° C. and 25 39° C. In a few cases patients already sick with the fever were treated with 2–3 doses of the same vaccine with satisfactory results. The epidemic was stopped and no case of typhoid has occurred for more than 6 months.

ii. Bile powder is made of fresh bile from cattle, sterilized in a boiler, filtered and dried by heat and then over sulphuric acid. This powder is readily soluble in water. A solution is made of 1·0 gm. peptone, 2·5 gm. sodium sulphate, 0·5 gm. salt and 7–8 cc. water. Boil and keep on hand.

For the test 100 cc. of the suspected water is mixed with the solution above mentioned and incubated for 8 hours. Then there is added to it a solution composed of 3 gm. of the bile powder, in 7–8 cc. of distilled water sterilized with steam and mixed with 1 cc. of 1–1.000 crystal violet. This after a thorough shaking is incubated until the next day and it is then plated out on Endo media.

iii. This was found to be a little weaker than the corresponding action against the typhoid organism. It is stronger against A than B.

J. H. T. W.

BOURGES (H.). **Cinq cas de fièvre typhoïde observés chez des sujets ayant subi antérieurement la typho-vaccination préventive.**—*Arch. Méd. et Pharm. Nav.* 1918. Mar. Vol. 105. No. 3. pp. 224–235.

The five cases were treated in the hospital at Brest. Blood culture showed four cases of typhoid infection; the fifth case was due to *B. paratyphosus* A. All five patients recovered. Three of the five had received protective inoculations of CHANTEMESSE'S vaccine; the other two were protected with VINCENT'S vaccine. The chief point of interest appears when the time of the protective vaccination is compared with the date of the attack. In case I the attack appeared *one year* after the date of vaccination; in case II the period between the two events was about *four months*; in case III the time elapsed was *one year* and in the two remaining patients there was a period of about eleven months between the vaccination and the onset of the disease. [These detailed observations confirm the belief, generally held, that the protective power of anti-enteric vaccines is generally exhausted after a period of twelve months.] J. H. T. W.

Bassett-Smith (P. W.). **Antityphoid Inoculations and Cases of Infection during the Third Year of the War.**—*Jl. Roy. Nav. Med. Serv.* 1918. Apr. Vol. 4. No. 2. pp. 141–143.

This report of antityphoid inoculations in the navy carries the record from October 1916 to September 30th, 1917 [see this *Bulletin*, Vol. 9, p. 468]. A triple vaccine was used.

Number of men inoculated.	One inoculation.	Two inoculations.
21,695	1,578	20,117.

The total number of enteric infections was 144.

Typhoid, 93; Deaths, 3 (not inoculated).

Distribution for Place.

	Total	One inoculation	Two inoculations	? Inoculated.	Not inoculated.
England and Home Fleet	26	1	1	—	24
France and Dunkirk	3	—	2	—	1
Mediterranean ..	37	5	10	—	22
Mesopotamia ..	7	—	—	5	2
Africa	5	—	—	2	3
St. Vincent ..	6	—	—	.	6
Elsewhere	9	—	—	1	8
	93	6	13	8	66

Distribution for time after inoculation.

	Months				
Over	(3)	(6)	(12)	(24)	Not stated
6 inoculated once	1	1	2	—	2
13 inoculated twice	—	2	8	2	1

In agreement with most observers Dep. Surgn. Genl. Bassett-Smith, R.N., concludes that protection "appears to be greatly reduced after a period of twelve months, and inoculations should certainly be repeated at the end of eighteen months."

Paratyphoid A—21; 1 death (not inoculated).

	Once	Twice	Doubtful	Not	Total
Mediterranean ..	1	7	1	5	14
Mesopotamia ..	2	2	2	1	7
	3	9	3	6	21

Paratyphoid B—30.

	Total	Once	Twice	Doubtful	Not
England	2	—	—	—	2
France	1	—	—	—	1
Mediterranean ..	19	1	12	1	5
Mesopotamia ..	2	—	—	—	2
Africa	6	—	—	2	4
	30	1	12	3	14

J. H. T. W.

LAROCHE (Guy) & MAZET. **Note sur la vaccination antityphoïdique et paratyphoïdique des Canaques.**—*Bull. Acad. de Méd.* 1918. Mar. 19. 3 Ser. Vol. 79. Year 82. No. 11. pp. 252–255.

Owing, it is stated, to a belief that the Kanakas were exposed to enterica infections in early life and thus acquired immunity, the 500 members of a working-party brought to France were not protected by vaccination. These Kanakas were not of very robust physique and in a short time after their arrival 25 men were down with enteric fever. Blood cultures showed the presence of *B. typhosus, B. paratyphosus* A, and *B. paratyphosus* B. Among a similar contingent of vaccinated Tahitians, under similar conditions, no cases occurred.

The authors then inoculated 391 Kanakas using two doses of a triple vaccine; 47 were excluded because they showed signs of dysentery, " malaria " or albuminuria. [With reference to " malaria," see LANDE (P.), this *Bulletin*, Vol. 9, p. 470.] The vaccination was well borne.

J. H. T. W.

GAUDUCHEAU (A.). **Bacille paratyphique de Nam-Dinh.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1916. July. Vol. 7. No. 7. pp. 239–242.

Refers to a case having the clinical aspect of typhoid fever. After death a bacillus with the characteristics of *B. paratyphosus* B was isolated.

J. H. T. W.

MIRGUET. **La fièvre typhoïde et la javellisation de l'eau de boisson à Sidi-Abdallah, 1913–1917.**—*Arch. Méd. et Pharm. Nav.* 1918. Mar. Vol. 105. No. 3. pp. 205–215.

A full and detailed account of purification of polluted water with hypochlorite of lime; applying the principles originated by JAVELLE :—" Eau de Javelle " : hypochlorite of potassium or sodium.

J. H. T. W.

LE ROY DES BARRES. **Fièvre typhoïde, perforation intestinale laparotomie, suture de la perforation, guérison.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1917. June. Vol. 8. No. 1. pp. 19–21.

The patient, a young man 21 years of age, was admitted into the Protectorate Hospital, Hanoi, on May 15th, 1917. Evening temperature 39·1° C., with extreme prostration, sub-delirium, dry, baked tongue, slight enlargement of the spleen and constipation, violent pain in the abdomen during the evening of the 16th. Temperature 40° C. on 17th and condition serious on 18th with vomiting and signs of perforation. There was marked peritonitis and the fluid in the pelvis had a faecal odour. In the ileum close to the caecum a perforation was found about 1·5 mm. in diameter. During the operation an Ascaris passed through the hole in the gut. A small dose of castor oil given on the 21st was followed by expulsion of six Ascaris. Recovery was steady and the patient was discharged cured on June 27th.

For similar operations see this *Bulletin*: TAKAKI (Y.), Vol. 8, p. 83.

J. H. T. W.

PLAGUE.

CORNWALL (J. W.) & MENON (T. Kesava). **On the Possibility of the Transmission of Plague by Bed-Bugs.**—*Indian Jl. Med. Res.* 1917. July. Vol. 5. No. 1. pp. 137–159.

The preliminary investigations made in connection with this research were in full agreement with the observations of BACOT and other workers, in that a large proportion of the bugs infected with the strain of *B. pestis* used succumbed in a few days, the time of the survival having some relation to the dose of the bacilli. Two methods of infection were employed—(1) by feeding the bugs artificially through a membrane of rabbit skin on citrated rabbit blood mixed (a) with plague bacilli in such numbers that every bug that fed was certain of a heavy infection, (b) with a broth culture diluted 1/10,000 and 1/100,000; (2) by feeding them directly on the clipped abdomen and groins of septicaemic guinea-pigs. The results obtained by either method were substantially the same. Non-pathogenic organisms, " a tetra bacillus isolated from the air and a water bacillus isolated from the tap," also proved to be pathogenic to the bug, though they were quite harmless to guinea-pigs on subcutaneous inoculation. The following Table shows the lethal effect of the ingestion of plague bacilli by bugs.

Eleven bugs fed on citrated rabbit blood mixed with a culture of *B. pestis*.

		Examination of stomach contents.	
		Microscope.	Culture.
After 1 day	..All alive	..	..
„ 2 days	..1 dead	+	+
„ 3 „	..2 „	+ in both	+ in both
„ 4 „	..1 „	+	+
„ 6 „	..3 „	+ in all	+ in all
„ 8 „	..1 „	+	+
„ 10 „	..1 killed	+	+
Total	9		

With regard to the actual transmission of plague by means of infected bugs, the authors observe that " no one but Verjbitski has as yet had any success," though " Bacot reports one death among rats after feeding plague infected bugs on them, but does not state that the cause of death was verified." The authors' own experiments show that while plague bacilli can survive and multiply in the stomach of the bug, in one case for at least 38 days, and retain their virulence for guinea-pigs, all attempts to transmit plague to these animals by means of bites of infected animals failed.

In their experiments they demonstrated that bugs cannot regurgitate their stomach contents in the act of feeding and if infection be transmitted at all through feeding, it must be due to the washing out of the bacilli, which have been stranded in the sucking tubes, by means of the bugs' saliva.

In some cases *B. pestis* was isolated from the sucking tube 46 hours after the infecting feed. Infection by such means is only likely to happen if the bug has not satisfied its appetite on the infected host and has an opportunity of feeding on a fresh host before it has troubled to clean out its sucking tube.

In conclusion it is observed that it cannot yet be stated whether bugs can or cannot transmit plague by biting, but that the likelihood of the transmission of human plague by bugs in biting under natural conditions is small.

R. St. J. Brooks.

Otten (L.). **Over den infectiositeitsduur der Indische rattevloo** (*Loemopsylla cheopis*). [The Duration of Infection of the Indian Rat Flea.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 2. pp. 309–315.

The results of these transmission experiments are somewhat similar to those obtained by Bacot in 1915 [see this *Bulletin*, Vol. 5, p. 393]. Bacot's work was carried out in England with mice and with *Ceratophyllus fasciatus* as the infecting flea, while these experiments were made in Java with three different species of rats and with *Loemopsylla* (*Xenopsylla*) *cheopis* as the vector of plague.

The experiments were commenced in January 1916; the three species of rats used being *Mus rattus griseiventer*, the common house rat, *Mus concolor*, the small house rat and *Mus diardii*, the field rat. Each species was placed in a separate cage, which contained a countless number of fleas, which had fed on three septicaemic rats as a source of infection.

During the first week the rats were only placed a few hours in the cages for fear of re-infection. Fresh rats were put in at intervals of three days, so as not to lose many fleas through too frequent chloroforming of the rats. The results of these experiments are shown in the table on following page.

It will be observed that the longest infection period was 43 days in the case of *Mus concolor*, 37 days for the field rat and 36 days for the common house rat.

R. St. J. B.

Hata (H.). **[Pest Dissemination through the Agency of Fleas.]**—*Saikingaku Zasshi* (*Jl. Bacteriol.*). 1917. Feb. 10. No. 257. pp. 131–148.

[From Review by R. G. Mills.]

The idea that plague is perpetuated by the eating of carcases of rats which have died from the disease would presuppose a larger percentage of mesenteric gland infection than has been met with in

House Rat.	Placed in cage.	Taken out of cage.	No. of hours Exposed to Infection.	Died of Plague.	Duration of Infectivity.	Concolor.	Placed in cage.	Taken out of cage.	No. of hours Exposed to Infection.	Died of Plague.	Duration of Infectivity.	Field Rat.	Placed in cage.	Taken out of cage	No. of hours Exposed to Infection.	Died of Plague.	Duration of Infectivity.
No. 1	3·1	3·1	3	6·1	3	No. 1	2·1	2·1	3	6·1	3	No. 1	2·1	2·1	3	—	3
No. 2	6·1	6·1	5½	8·1	6	No. 2	6·1	6·1	5½	9·1	7	No. 2	6·1	6·1	5½	11·1	7
No. 3	9·1	9·1	4	11·1	9	No. 3	9·1	9·1	4	13·1	10	No. 3	9·1	9·1	4	12·1	10
No. 4	12·1	12·1	5	14·1	12	No. 4	12·1	12·1	5	17·1	13	No. 4	12·1	12·1	5	17·1	13
No. 5	15·1	15·1	4	18·1	15	No. 5	15·1	15·1	4		16	No. 5	15·1	15·1	4	19·1	16
No. 6	18·1	18·1	7	21·1	18	No. 6	18·1	18·1	7	21·1	19	No. 6	18·1	18·1	7		19
No. 7	21·1	21·1	5	24·1	21	No. 7	21·1	21·1	5	24·1	22	No. 7	21·1	21·1	5	25·1	22
No. 8	24·1	24·1	5½	27·1	24	No. 8	24·1	24·1	5½	—	25	No. 8	24·1	24·1	5½	—	25
No. 9	27·1	27·1	5	30·1	27	No. 9	27·1	27·1	5	—	28	No. 9	27·1	27·1	5	31·1	28
No 10	30·1	31·1	24	2·2	30	No. 10	30·1	31·1	24		31	No. 10	30·1	31·1	24	—	31
No. 11	2·2	3·2	24	5·2	33	No. 11	31·1	1·2	24	4·2	32	No. 11	2·2	3·2	24	—	34
No. 12	5·2	6·2	24	8·2	36	No. 12	2·2	3·2	24	6·2	34	No. 12	5·2	6·2	24	10·2	37
No. 13	8·2	9·1	24	—		No. 13	5·2	6·2	24	—	37	No. 13	8·2	9·2	24	—	
No 14	11·2	12·2	24	—		No. 14	8·2	9·2	24	—	40	No. 14	11·2	12·2	24	—	
No. 15	14·2	15·2	24	—		No. 15	11·2	12·2	24	15·2	43	No. 15	14·2	15·2	24		
No. 16	17·2	18·2	24	—		No. 16	14·2	15·2	24	—		No 16	17·2	—	—	—	—
No. 17	20·2	—	—	—		No. 17	17·2	18·2	24	—							
						No. 18	20·2	—	—	—							

the experience of the author. His examinations, carried out at Hyoko Province, Japan, have resulted as follows:—

Date.	Submaxillary Gland	Axillary Gland	Inguinal Gland.	Submaxillary and Inguinal Glands.	Lumbar Gland.	Septicaemia.
1909–1910	15·4 p.c.	16·1 p.c.	28·6 p.c.	—	—	39·7 p.c.
1913–1914	19·4 p.c.	12·3 p.c.	17·6 p.c.	17·3 p.c.	17·6 p.c.	—

In view of these results the conclusion is arrived at that the infection must have reached the glands from the skin rather than from the intestines, thus strengthening the view that it was conveyed by flea infection rather than by feeding on infected material.

R. St. J. B.

DE RAADT (O. L. E.). **De rol van de huisrat in de epidemiologie der pest.** [The Rôle of the House Rat in the Epidemiology of Plague.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 4. pp. 520–533.

In this communication de Raadt re-affirms his conclusions with regard to the signification of the "house-rat" *Mus rattus griseiventer*, in relation to the spread of plague from district to district in Java. He regards the investigations of OTTEN (which tend to dispute this opinion) as incomplete, and not invalidating in any way the case already made out for the house rat as a carrier of plague, by van LOGHEM, SWELLENGREBEL and himself, in previous communications. [See this *Bulletin*, Vol. 9, p. 477.]

R. St. J. B.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. (Bijblad van het.) 1916. Vol. 55. No. 4. 98 pp. **Dienst der Pestbestrijding. Verslag over het vierde kwartaal 1915 tevens jaarverslag.** [Report of the Plague Prevention Service for the Fourth Quarter of 1915, with Annual Summary.]

Report of the Plague Prevention Service for Eastern Java [for the previous quarter see this *Bulletin*, Vol. 9, p. 84]. A Table shows the case-incidence for the various districts concerned in comparison with the corresponding quarter of the four preceding years.

A considerable decrease in the number of cases is shown as compared with the corresponding quarters of the two preceding years. The total number of cases for the year 1915 was 6,237, as compared with 15,758 for 1914, and 11,386 for 1913. Of the 6,237 cases reported only 267 recovered (a percentage of 4·3).

Between August 20th and December 15th of the current quarter 601 rats were examined for fleas, the flea-index for *Mus decumanus* being 5·0, and for the house rat 5·5.

J. B. Nias.

DE RAADT (O. L. E.). **De Pestbestrijding voorheen en thans.** [Plague Combat—Past and Present.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 3. pp. 342–346.

The author discusses the various methods applied in the past in connection with plague eradication, such as the evacuation of the infected populations into central barracks, the sulphur fumigation of the infected houses and also the system of temporary improvement of the dwelling houses, at present in vogue in Java. He points out the extreme difficulty and unpopularity of the methods of evacuation employed and also the very considerable cost of such procedure to the State. A judicious combination of the various methods used from time to time probably yield the best results.

R. St. J. B.

PARRY (R. C.). **Pneumonic Plague Prevention on the Tibetan Border.** —*China Med. Jl.* 1918. Jan. Vol. 32. No. 1. pp. 81–87.

A small epidemic of what appears to have been pneumonic plague, broke out in the autumn of 1915 on the Tibetan border at the village and monastery of Mai-uh and infection was carried thence by a merchant to the town Taochow. The outbreak followed the skinning and eating of a marmot (Tarbagan) found dead on the hills. The state of affairs at Taochow was made known to the author by a local missionary and immediate steps were taken, in co-operation with the Chinese Governor-General, to send a relief party to the infected district and to provide funds to meet all expenses. After many vissitudes the little expedition reached its destination where it was found that 17 deaths from the disease had already taken place. In spite of great opposition from the Moslem population the city was put under strict quarantine and arrangements were promptly made for the isolation and treatment of the sick and their contacts, the burial of the dead and the disinfection, or demolition by burning, of infected premises. These measures appeared to have been entirely successful and the epidemic had quite spent itself by the time the expedition returned to its head-quarters. [No bacteriological diagnosis of the disease appears to have been made.]

In conclusion it is remarked that "the symptoms of the disease as seen in Taochow resembled rather closely those which marked the Manchurian outbreak, judging by reports at that time, but the disease in Taochow seems to have been less virulent, less infectious. The intensely cold weather of the high altitudes in this part of the world may have reduced the viability of the infecting bacilli, and the great distances and poor means of communication between one district and another probably did much to check the spread of the epidemic."

R. St. J. B.

Davies (D. S.). Notes on Plague in Bristol in 1916.—*Bristol Medico-Chirurg. Jl.* 1917. Vol. 35. No. 132. pp. 16–18.

This is a brief note on the methods adopted by the Public Health Authorities in combating the small outbreak of rat plague which occurred in Bristol in the autumn of 1916 [see this *Bulletin*, Vol. 10, p. 286]. The work appears to have been done very thoroughly, the warehouse in which the infection originated, and its contents, being destroyed by fire after elaborate precautions had been taken to prevent the escape of possible infected rodents.

A large area surrounding the district was mapped out, inspected in detail and rat-catching systematically carried out for six months. Over 9,000 rats were caught, and of these nearly 2,000 were examined at Bristol University Laboratory for evidence of plague. No plague rats were found in the Port or City other than those actually in the warehouse itself, and no further cases have occurred. No explanation has been forthcoming of the "one-spot infection" in the centre of the city, which may have been accidental or intentional.

R. St. J. B.

Creel (R. H.) & Simpson (Friench). Rodent Destruction on Ships. A Report on the Relative Efficiency of Fumigants as determined by Subsequent Intensive Trapping over a Period of one Year.—*Public Health Rep.* 1917. Sept. 7. Vol. 32. No. 36. pp. 1415–1450.

In these experiments the authors have put the relative efficiency of fumigation by cyanide gas and sulphur dioxide respectively to a practical test. A combination of circumstances at New Orleans made such a test feasible, the favourable circumstances being the fumigation of a large number of vessels at the port of New Orleans and at the Service quarantine station, and the availability of a large and experienced force of trappers.

The proportion of cyanide used was 5 ounces per 1,000 cubic feet of space with duration of exposure of 1¼ hours for holds and one-half hour for superstructures. Sulphur when used was in the proportion of 3 pounds per 1,000 cubic feet of space, with duration of exposure of 6 hours for holds and superstructures alike.

The following Tables, taken from the authors' paper are self-explanatory:—

Table I.

Nature of fumigant.	Number of vessels treated.	Number of rats killed by fumigant.	Number of rats trapped.	Percentage of efficiency of fumigant.
				per cent.
Sulphur dioxide	62	747	223	77
Cyanide gas ..	182	2,811	121	95

TABLE II.

Nature of fumigant.	Number of vessels recorded.	Compartment of vessel considered.	Number of rats killed by fumigation.	Number of rats subsequently trapped.	Percentage of efficiency of fumigant.
Sulphur dioxide ..	32	Superstructure*	133	107	55
Cyanide gas ..	31	do.*	729	45	94
Sulphur dioxide ..	28	Holds (empty)	702	28	96
Cyanide gas ..	34	do.	854	9	99
Sulphur dioxide ..	10	Holds (loaded)	104	59	64
Cyanide gas ..	10	do.	80	20	80

*Superstructures include storerooms, crews' quarters, cabins, poop deck, etc.

"The results obtained from the two methods of fumigation are contrasted and indicated in the table, and it will be noted that there is a very marked disparity in the efficiency of sulphur dioxide as compared with cyanide gas, in the treatment of superstructures. These compartments, such as store rooms, poop decks, crews' quarters, etc., are generally partially filled with supplies, stores, dunnage, etc., and it would appear that the greater effectiveness of cyanide gas is due to its greater penetrating powers, as well as toxicity. It may also be that sulphur dioxide, on account of its odor, may provide more of a warning to the rats and enable them to secure greater protection; whereas cyanide with less odor and without the physically irritating properties of sulphur dioxide, may result in the destruction of the animal before it can secure available covert.

"In the fumigation of the empty holds of vessels there is no material difference in the results obtained, although here as elsewhere there should be considered the difference in the length of exposure. Considering the respective gases, the results on vessels fumigated with cargo-laden holds indicate a greater efficiency for cyanide gas, although the number of vessels tabulated is rather small for the establishment of any general conclusions. Conditions in storerooms, crews' quarters, poop decks, etc., are more or less similar to those of loaded holds, and on the basis of the results of the fumigation of these superstructures, it is believed that it can safely be asserted that cyanide gas is far more effective in the fumigation of loaded holds than is sulphur dioxide."

R. St. J. B.

BRAYNE (W. F.). **Intravenous Eusol in Plague.**—*Indian Med. Gaz.* 1917. Sept. Vol. 52. No. 9. pp. 322–323.

The treatment of plague by means of intravenous eusol solution was suggested by CONNOR in 1916 [this *Bulletin*, Vol. 8, p. 258]. This method of treatment has been carried into effect in a case of pneumonic plague with highly successful results. The eusol solution was prepared as follows:—

"One litre freshly distilled water to 12½ grammes boric acid and 12½ grammes chloride of lime. To the resulting eusol 8·5 grammes sodium chloride per litre were added. Subsequent estimation of the chlorine content of the chloride of lime, which was the best procurable at the time, showed that it was only half strength. So the eusol was weaker than that used by previous observers."

The case under treatment was one of typical pneumonic pest. The sputum was characteristic and was crowded with bi-polar staining bacilli and contained much elastic tissue. 75 c c. eusol were prepared as above and given intravenously. After an initial rise of temperature and rigor the temperature fell steadily and was normal ten hours after injection. Plague bacilli had disappeared from the sputum in three days and the patient made an uninterrupted recovery.

This successful result of eusol treatment was not repeated in connection with bubonic plague; the drug did not appear to influence the course of the disease. The eusol could not, apparently, act on the bubo in the same manner as it might be supposed to act on the lungs. The use of stronger eusol solution and the extirpation of the buboes is suggested.

R. St. J. B.

EBERSON (Frederick). **Active Immunity to Systemic Plague Infection.** —*National Med. Jl. of China.* 1917. Dec Vol. 3. No. 4. pp. 125–140. *Jl. Infect. Dis.* 1918 Jan. Vol. 22. No 1. pp. 62–73.

The close relationship of the phenomenon of antianaphylaxis and that of resistance to proteotoxin suggest the feasibility of applying the facts concerning the former to any method involving apparently similar principles. Repeated amounts of protein at short intervals result in a state of antianaphylaxis or immunity to later injections.

It seems reasonable, therefore, to assume that repeated injections of proteotoxin, if this contains specific substances of the plague organism, will give rise to an immunity towards plague itself.

In these experiments the materials used in the production of proteotoxins were *B. pestis*, anti-pest serum from rabbits injected with plague bacteria, and normal horse serum. *B. pestis* was grown on plain agar slants and incubated at from 30° to 35° C. for 24 hours. The slants were of approximately uniform size, and experience with the inoculation of cultures made it possible to attain considerable accuracy for the purpose. Sensitizer was obtained according to the following method: Healthy rabbits, in weight between 1,200 and 1,600 gm., were injected with plague bacilli emulsified in salt solution and heated for 30 minutes at 58° C. At first, intravenous injections were made, but it was found that intraperitoneal inoculation was attended with less danger of sudden death due to agglutination in the capillaries, and likewise was capable of producing a serum potent enough for the purpose. In addition, this method of injection seemed to be more easily borne by the animals. The amount of culture, given at weekly intervals, was gradually increased from 0·1 of a slant up to a whole slant, the dosage usually being 0·2, 0·4, 0·6 of a slant for the second, third and fourth inoculations. At times, this treatment was modified according to the reaction of the animal so that a whole slant was injected one week after the third dose of 0·4 or 0·5 of a culture. On an average the rabbits received four doses. The criterion was always serum so obtained, which was measured microscopically for its agglutinating power. This seemed rather remarkable in its rapidity, for when the bacterial suspension received the heated sensitizer, an almost immediate flocculation ensued, and within a few minutes the bacteria formed minute clumps in a clear fluid. Within 30 minutes at body temperature, the organisms always settled to the bottom of the tube, leaving a clear fluid above.

Horse serum was prepared in the usual way from the jugular vein. No serum was used which exceeded eight weeks in age.

The preparation of proteotoxin was as follows:—Agar slants of *B. pestis* were washed off with 0·25 c c. salt solution, and sensitizer, heated at 56° C. for 30 minutes, was added to the emulsion in the proportion of 1·5 to 2·0 c.c. for each 1·5 slants. After one hour's incubation at 37° C. the material was centrifugated for ten to fifteen minutes, the supernatant fluid pipetted off and the bacterial sediment washed once with salt solution. Normal horse serum was then added to the sensitized complex in amounts of 10 c.c. for each 1·5 slants of *B. pestis* used. The final mixture was placed in large centrifuge tubes and incubated for 14 hours at 35° C. to 37° C. At the end of this period, the material was centrifugated for one hour at moderate speed. The supernatant fluid when pipetted off was clear and gave no turbidity on agitation. Tests for the presence of *B. pestis* were invariably negative. Prior to injection the clear fluid was heated to 56° C. for 30 minutes.

Except where otherwise indicated the intraperitioneal method of injection was used. The absorbtion by this route seemed to be slower and in the amount given, devoid of shock, which was usually so severe in the case of intravenously injected (marginal vein) animals *that death supervened within a few minutes. Very often the rabbit* thus treated died within a day or two, or at the most after a week, with severe emaciation and slow poisoning. Intraperitoneally administered, the proteotoxin caused no visible disturbance in the animal other than a slight uneasiness at first. Ten to eleven days after the last injection with proteotoxin virulent *B. pestis* was administered.

The following conclusions are arrived at:—

"The treatment of rabbits with proteotoxins obtained with *B. pestis* confers a definite resistance on the part of the animal to systemically introduced plague organisms.

"There is apparent protection in at least 75 per cent. of the animals treated, *taking* the entire number *of cases into consideration. Below a* certain dose of bacteria, the protection conferred is much greater.

"Combined intravenous and intraperitoneal injections of the proteotoxin seem to be more effective than either method by itself, although intraperitoneal treatment of rabbits results in a powerful resistance to plague bacteria administered by that route.

"The immunity, so far as it has been possible to determine in these experiments, is definitely marked for at least one month after treatment.

"Injections given at intervals of two to three weeks give rise to a definite resistance to inoculation with living virulent plague bacilli.

"*B. pestis* appears to be the matrix for a specific poisonous substance of the nature of proteotoxin, and capable of inducing a specific resistance to the organism which is used in the manufacture of the toxic element.

"Observations so far support the hypothesis that one of the most potent factors in the protective mechanism is that of leucocytosis."

R. St. J. B.

Drennan (Jennie G.) & Teague (Oscar). **A Selective Medium for the Isolation of *B. pestis* from Contaminated Plague Lesions and Observations on the Growth of *B. pestis* on Autoclaved Nutrient Agar.**—*Jl. Med. Res.* 1917. July. Vol. 36. No. 3. (Whole No. 163.) pp. 519-532.

An attempt has here been made to evolve a medium on which plague bacilli derived from contaminated sources, such as decomposing rat carcasses, will flourish by means of the selective inhibition of the contaminating bacteria present. The work was inspired by the researches of Churchman and others with regard to the inhibiting action of Gentian violet on certain bacteria. It was found that gentian violet inhibited the growth of *B. subtilis* but did not affect the growth of *B. prodigiosis*, and the conclusion was arrived at that bacteria could, on that account, be divided into two classes, viz., those violet-positive and those violet-negative; the former corresponding to the Gram-positive organisms and the latter to the the Gram-negative. This distinction was found to hold good for most of the common Gram-positive and Gram-negative organisms.

The stock agar used in the authors' experiments was prepared as follows:—One pound of beef-heart was passed through a meat-chopping machine and soaked in one litre of distilled water over night in the ice-box. The fluid was squeezed through cheesecloth, heated to boiling, and filtered through filter paper. One per cent. peptone, one-quarter per cent. sodium chloride, and one and one half per cent. agar were added; four c.c. of normal NaOH solution was added to prevent a too high degree of acidity, and the mixture was heated for 30 minutes in the autoclave at 15 lbs. pressure. The medium was titrated to +1 (hot titration), cleared with egg-white, filtered through cotton-wool and stored in flasks. It was found that when a mass of plague bacilli were inoculated upon this nutrient agar an abundant growth developed, but if isolated plague bacilli were scattered over the surface of the agar they did not grow into colonies. It was thought that toxic substances were developed in the agar during the sterilization by heat and it was found that by adding a small quantity (·025 per cent.) of sodium sulphate to the medium, immediately before beginning the sterilization, this effect was neutralized.

Various quantities of different aniline dyes were then added to the sulphated agar to determine their relative efficiency in inhibiting the growth of contaminating micro-organisms without prejudicing the development of any plague bacilli present. Hoffman violet, for example, was found to be eight hundred times more toxic for the *Staphylococcus aureus* than for *B. pestis*, nile blue five hundred times, crystal violet one hundred and forty times, and so on. Tests carried out with decomposing plague infected spleen and bubo indicated that nutrient agar containing 1/700 per cent. crystal violet was probably the most effective medium of those tried.

Grübler's stains were used exclusively in the experiments made. All cultures of *B. pestis* were incubated at 30° C., the optimum temperature for this organism.

R. St. J. B.

Sameshima (K.). **[Plague Bacilli in a Cat.]**—*Saikingaku Zasshi* (*Jl. Bacteriol.*). 1917. Apr. 20. No. 259. p. 6.

[From Review by R. G. Mills.]

In October 1916 in Yokkaichi, where plague was quite prevalent in rodents, a cat was found dead and examined bacteriologically. From the organs of the animal typical plague bacilli were isolated, which gave positive agglutination to a dilution of 1–320.

R. St. J. B.

Sukegawa (K.). **[Rat Septicaemia produced by a Bacillus resembling** *B. pestis***]**.—*Saikingaku Zasshi* (*Jl. Bacteriol.*). 1917. Jan. 15. No. 256. pp. 38–46.

[From Review by R. G. Mills.]

During routine examinations of rats for the presence of plague infection an organism, resembling *B. pestis,* but of an unusual type was discovered. Morphologically it was slightly larger than *B. pestis* and had blunt extremities. The organism did not possess spores or capsule, was Gram-negative, non-motile, aerobic and grew readily on ordinary media. On agar the colonies were dew-drop like, sticky and stringy in consistency. Colonies had a concentric appearance and did not spread very broadly over the medium. No involution forms appeared on salt agar. The colonies were small and flat on gelatin and in stabs there were few lateral projections and no liquefaction of the medum. There was no fermentation in sugar media. In broth there was a heavy sediment and the organisms took on a diphtheroid appearance. No indol was produced in peptone solution and milk was coagulated in three days.

Guinea-pigs showed very little pathological change on inoculation with cultures of the organism, but rats and mice were much more susceptible and in them slight oedema and injection of the tissues around the point of inoculation were observed. Large doses inoculated into the abdominal cavity caused hyperaemia at the site of puncture and the subsequent death of the animal, but with smaller doses a chronic condition was produced. The abdomen was distended with a dirty grey fluid, punctate haemorrhages were scattered through the organs and many foci of infection were seen in the viscera, especially the spleen, from which a bi-polar organism could uniformally be isolated. In animals killed during the chronic stage the mesenteric glands were greatly swollen, the cervicals were dark red, large, and full of tubercle-like foci. Ducks, chickens and doves were not infected.

Serum reactions with this bacillus and with *B. pestis* gave definite proof of the difference between the two organisms. Immune serum derived from the new bacillus could protect against a lethal dose of the organism, against which anti-plague serum gave no protection whatever.

R. St. J. B.

BOOK REVIEW.

WATERS (Ernest E.) [M.D. (Edin.), M.R C.P. (Lond.), Lt. Col. I.M S]. **Diabetes. Its Causation and Treatment (with Special Reference to India).**—ii + 170 pp. 1917. Calcutta: Thacker, Spink & Co. [Price Rs.4.]

Although the title of this book stands unqualified, the author deals only with Diabetes mellitus or Glycosuria. Within its modest limits the work contains the most modern views as to treatment, full information for the student and practioner, and a message of hope for the sufferer.

Sugar is as necessary to the animal as to the plant, and is carried in the blood stream of the one as in the sap of the other. In health the sugar intake is stored as glycogen in the liver and the muscles ; a small amount is used for production of energy and, if there be still excess of supply beyond what is required for such demands, such excess goes to help in the formation of fat. Col. Waters gives the normal blood content of sugar in Bengalis as 0·130 per cent., while in Europeans the estimated percentage is 0·080 (McCay). The estimates for Indians were made by the Benedict-Cammidge method, chosen on account of simplicity. The necessary reagents and apparatus are fully and carefully described. It must of course be remembered that the tolerance of carbo-hydrates varies in healthy persons of the same race and differs still more in races using different diets. The percentage of sugar may, therefore, vary within fairly wide limits as is shown by Col. Waters: "Taking 50 normal Bengalis the minimum was 0·087 and the maximum 0·18."

But, let there be some obstruction or breakdown in the mechanism which controls sugar metabolism, either in the brain, in the pancreas or elsewhere, and straightway the normal process is upset and sugar appears in the urine. In chapter 2 the best and most modern tests, qualitative and quantitative, are described in detail. The author recognizes the value of an accurate knowledge of the total daily output of sugar in the total amount of urine as expressed in grains. "A patient is not much interested in the difference between 5 per cent. and 2 per cent. of sugar, but if he be told that his sugar output has dropped from 1,200 grains to 150 grains per diem, he feels that some real progress is being made with his case, and is proportionately encouraged."

The classification, symptoms and complications of diabetes receive the same detailed consideration as is given to the physiology and pathology of the disease. The various possible causes of diabetes are discussed ; but, although we may safely say that we know the conditions and consequences of the malady the true cause is still among "the waste of things unknown."

The most important chapters are those dealing with treatment. Col. Waters emphasizes the fact that "to ask an Indian vegetarian patient to live on a carbohydrate-free diet" is to advise an impossibility. Even with Europeans and Eastern, or Western, races using a mixed diet it has not up to now been possible to lay down any really satisfactory line of treatment. We, therefore, welcome with satisfaction a modern and at least rational attempt to deal with the relief of the malady even though cure is still unattainable. Passing over the systems in use up to the present time we arrive at the method of treatment "by alimentary rest, after the plan devised by Allen." Dr. Allen's system (*Boston Med. & Surg. Jl.* 1915, Feb.) rests on the belief that "diabetes is first a weakened function of carbohydrate mechanism, subsequently a weakening of protein metabolism, and finally in the severer cases, imperfect metabolism of fat." He believes that the body of the diabetic may if freed from sugar by starvation be gradually re-educated to deal with small and increasing amounts of carbohydrate material. In these days when brevity is the soul of economy full details of the method cannot be given in a review, but it may at least be said that Allen's statistics and the cases quoted and described by Col. Waters strongly support the theory. This part of the author's work, so important to the relief of vegetarian races in India, is indeed good tidings For its success however it requires intelligent cooperation between doctor and patient Col Waters shows how difficult it is to get even educated patients to submit loyally to the only conditions which can bring relief and change a life of misery into a life of comparative comfort Of other methods of treatment by dieting and of the use of drugs in diabetes the book contains a fair statement One great advantage of the re-education treatment is that it ignores all sham diabetic foods offered to the sufferer asking for bread

Owing to the home and origin of the new treatment most of the statistics relate to a temperate climate and to white races The author gives full notes of a small number of cases treated in Bengal Europeans and Indians In time more results will accumulate and it will be possible for investigators in India to settle certain questions of considerable interest One point to be considered is whether coma and acidosis are more or less prevalent among races dwelling in a tropical climate than among races in temperate zones Work in this connection has already been carried out in the tropical Atlantic region cf *Bulletin* 1917 Vol 10 p 46 Professor DELGADO PALACIOS working in the bio chemical laboratory of the Caracas University has reported that in diabetes coma is almost unknown in Venezuela

The book is very free from errors and actual misprints but one slight defect for which the author is not responsible distracts the reader's attention The type has not been properly wedged and many letters are found out of the ranks or in abnormal attitudes

J H Tull Walsh

INDEX OF AUTHORS.

A.

Abdulla, M. M., 274.
Abrami, P., 20
——, & Sénevet, G., 4.
Abriol, R., 254.
Accra, 210.
Aimé, H., 48.
Albert, J., 178.
Amar, J., 170.
Amblard, L. A., & Eschbach, H., 42.
Anderson, A. G., with Falconer, 27, 301.
——, H.W., 233.
Ando, R., 75.
de Andrade, A. D., 88.
Andreotti, M., 281.
Andruzzi, A., 274.
d'Anfreville, L., 38.
Antigua, 100.
Apicella, G., 14.
Appel, L., 13, 29, 303.
Aragão, H. de B., 206, 396, 421.
Arantes, J. B., with d'Utra e Silva, 428.
Arce, J. & Ribeyro, R. E., 209.
Archibald, R. G., with Chalmers, 224, 389, 398.
Armand-Delille, P., 11.
——, Gassin & Lemaire, H., 197.
——, Paisseau, G., & Lemaire, H., 40, 48, 453.
Arzt, L., 114.
Ashford, B. K., 276.
Ashigawa, B., with Yamano & Sano, 209.
Aubert, P., 45.
Aufrecht-Magdeburg, 309.

B.

Baehr, G., 133, 134.
——, with Plotz & Olitsky, 141.
Bahr, P., 65.
Bail, O., 120.
Bais, W. J., 191.
Baker, W. F., with Walters, & Koch, 250.
Balliano, A., 83
Ballner, F., & Finger, A., 138.
Banks, C., with Waddell, Watson, & King, 50.
——, H. S., & Evans, H. R., 440.
Barabás, Z., with Bardachzi, 97.
Barbosa, P., 415.
Bardachzi, F., & Barabás, Z., 97.
Barnes, W. S., 87.
Barratt, J. O. W., 66.
Bartlett, G. B., 65.
Bartolotti, C., 296.
Bass, C. C., 38.
Bassett-Smith, P. W., 456.
von Bassewitz, E., 393
Baujean, R., 226.
Baumgarten, A., & Langer-Zuckerkandl, H., 116.
Beintker, 262.
Beneke, R., 260.
Benians, T. H. C., 444.
Bensaude, R., with Florand, 271.
Bernstorff, 400.
Bertarelli, 35.
Bharucha, E. S., 399.
Bien & Sontag, F., 140.
Birge, E. G., with Cason, 17.
Biswas, S. C., 13.
Bittorf, 24.
Blacklock, B., with Stephens, Yorke, Macfie, Cooper & Carter, 26, 27, 298.
——, with Yorke, 90.
Blake, G. A., 183.
Blanc, G., 310.
——, with Chatton, 425.
——, J., 128.
Blanchard, M., 396.
Blau, 235.
Bloch, M., with Mattéi, 55.
Bombay, 211.
Bonnard, with Malloizel, 289.
Bouchet, H., with Fuchs, 48.
Bouffard, G., 399.
Bourges, H., 432, 455.
Bouvier, J. E., with de Goyon, 306.
Bouyer, 247.
Bowman, F. B., & Saylor, P. D., 97.
——, F. H., with Torrance, 41.
Brahmachari, U., 71.
——, U. N., 152.
Branch, S., 104.
Brayne, W. F., 465.
van Breemen, M. L., 37.
Breinl, A., & Priestley, H., 90.
——, F., 58.
Brill, E. H., 272.
British Guiana, 101.
British Medical Journal, 438.
Bruce, D., 234.
Brug, S. L., 246, 252, 422.
de Brun, H., 17, 294.

Bruyère, with Carnot, 15
Bryson, R., with Palk, 404.
de Bueu, S., 404
——, with Pittaluga, 238.
Bussière, F. 231.
Butler, C. S., & Hakansson, E. G., 217.

C.

Caille with Monier-Vinard, 15
Carnot, P., 33, 287.
——, & Bruyère, 15.
Carter, H. F., Mackinnon, D. L., Matthews, J. R., Smith, A. M., & Stephens, J. W. W., 46.
——, & Matthews, J. R., 46
——, with Stephens, Yorke, Blacklock, Macfie & Cooper, 26, 27, 298.
Carver, A. E., 38.
Cason, T. Z., & Birge, E. G., 17.
Castellani, A., 9, 115, 212.
Castelli, A., 121.
Cawston, F. G., 69, 80.
Cecikas, 65.
Ceylon, 110.
Chace, A. F., & Tasker, A. N., 62.
Chagas, C., 165.
Chalmers, A. J., & Archibald, R. G., 224, 389, 398.
——, & Innes, A., 398.
——, & Kamar, A., 398.
——, & King, H. H., 393.
——, & Pekkola, W., 63, 419, 421.
Chatton, E., 251, 252, 255, 303.
——, & Blanc, G., 425.
Chick, H., & Hume, E. M., 174, 175.
Christophorson, J. B., 153.
Christy, C., 38.
Chun, J. W. H., 180.
Ciauri, R., 244
Clapier, N., 95.
Clark, H. C., 429.
Clarke, C., with Dudgeon, 31.
Cleves Vargas, C. J., 406.
Climenko, H., 405.
Cobb, R., 178.
Cochrane, A. W. R., & Sprawson, C. A., 411.
Coghill, H. S., 409.
Cole, C. L., with Siler, 84.
Commes, C., 95, 418.
Coombs, C. F., 182.
Coonoor, 211.
Cooper, C. F., with Stephens, Yorke, Blacklock, Macfie & Carter, 26, 27, 298.
Cornwall, J. W., 211.
——, & Menon, T. K., 143, 459.
Costa Rica, 107.
Cot & Hovasse, 307.
Cox, F. E., 128.
Craig, C. B., 16.
Creel, R. H., & Simpson, F., 464.
Crowe, H. W., & Sprawson, C. A., 72.
Crowell, B. C., & Johnston, J. A., 119.
Csépai, C., 140.
Cumming, J. G., 188.
——, & Senftner, H. F., 126.
da Cunha, A. M., 430.
——, & da Fonseca, O., 53.
Curjel, D. F., 395
Cutler, D. W., & Williamson, R., 250.
Czaplewski, 273, 409.

D

Dadej, K., & Kraholska, M., 139.
Dale, H. H., & Dobell, C., 248.
Daniélopolu, D., 131.
Daniels, C. W., & Newham, H. B., 240, 315.
von Darányi, J., & Stransky, E., 264.
Dargein, 48.
Darwent, E. N., 396.
Davies, D. S. 464.
Debains, E., with Nicolle & Raphael, 442.
Delanoë, P., 7, 38.
Denney, O. E., 401.
Denzer, B. S., with Olitsky & Husk, 127, 136
Derivaux, R. C., 305.
——, Taylor, H. A., & Haas, T. D., 304.
Devic, A., with Dufourt, 256.
Diacono, H., 441.
Diamantis, 78, 81.
Dickson, W. E. C., 207.
Dietrich with Otto, 137.
Ditthorn, F., & Loewenthal, W., 59.
Dobell, C., 431.
——, with Dale, 248.
Docu, B., with Hatiegan, 300.
Doflein, F., 307.
Dold, H., 276.
——, with Fischer, 66.
Douglas, S. R., 64.
Drennan, J. G., & Teague, O., 468.
Dreyer, G., Gardner, A. D., Gibson, A. G., & Walker, E. W. A., 454
Dubois, A., 92.
Duchamp, C. J., 198.
——, J. C., 198.
Dudgeon, L. S., 202.
——, & Clarke, C., 31.
Dufourt, P., & Devic, A., 256.
Dunley-Owen, A., 20, 290.
Dutch Guiana, 102.

E.

Eberson, F., 466.
Ecker, E. E., 452
Edwards, W. R., 71.
Eggstein, A. A., with Jobling, 205
Emrich, W., with Walker, 51.
Engel, C., 273.
Erben, E., 26.
Eschbach, H., with Amblard, 42.
Escomel, E., 428.
Espinosa-Tamayo, L., 217.

Etienne, G., 439.
Evans, H. R., with Banks, 440.

F.

Falconer, A. W., & Anderson, A. G., 27, 301.
Fantham, H. B., 417.
de Faria, G., 87.
Feldmann, I., 118.
Ferguson, A. R., 76.
——, J. E. A., 86.
Fermi, C., 283.
Fickler, A. 265.
Fiessinger, N., & Leroy, E., 268.
Figueira, L., 256.
Fildes, P., 64.
Finger, A., with Ballner, 138.
Fiorito, G., 282.
Firth, A. C. D., 14.
Fischer, H., with Sordelli, 409.
——, J. C. H., 312.
——, W. & Dold. H., 66.
Fletcher, A. A., 256.
Florand, A., & Bensaude, R., 271.
——, & Malleterre, F., 68.
Foges, A., 272.
da Fonseca, O. O. R., 424.
——, O., with da Cunha, 53.
Forbát, A., 61.
Force, J. N., & Stevens, I. M., 452.
Foreman, F. W., & Graham-Smith, G. S., 236.
Foster, Jr. G. B., & Sinclair, C. G., 84.
——, W. D., with Hall, 98.
Foulerton, A. G. R., 123.
Fourest, 232.
Fox, S. C. G., 297.
Fraga, C., 309.
França, C., 423, 425, 427.
Freeborn, S. B., 291.
Fricke, W., 97.
Fricks, L. D., 186.
Friedemann, U., 259.
von Friedrich, L., 259.
Fuchs, A., & Bouchet, A., 48.
Fuerst, T., 57.
Fuller, E. B., 290.
Fumey, M., with Hollande, 263.

G.

Gabbi, 206.
——, U., 218, 219, 245.
Galata, G., 308.
Galli-Valerio, B., 199, 311.
Ganguli, S., 222.
Garcia, F., 96.
Gardner, A. D., with Dreyer, Gibson & Walker, 454.
Garin, C., & Girard, A., 291.
——, & Pasquier, Ch., 292, 293.
——, & Sarrouy, 292
——, Sarrouy & Pouget, 292
Garrow, R. P., 446.
Gasbarrini, A., 268.
Gassin with Armand-Delille & Lemaire, 197.
Gassner-Rostock, G., 264.
Gauducheau, A., 457.
Gauss, H., & Meyer, K. A., 169.
Gay, F. P., 440.
——, & Lamb, A. R., 452.
Geiger, J. C., with Kelly, 7.
Geneeskundig Tijdschrift voor Nederlandsch-Indie, 462.
Genuardi, G., 308.
Gibson, A. G., with Dreyer, Gardner & Walker, 454.
——, H. G., 59.
Giemsa, G., & Halberkann, J., 299.
Gildemeister, E., 439.
Gill, C. A., 5.
Girard, A., with Garin, 291.
Giugni, F., 220.
Goldberg, L., 394.
González Barrio, N., 145.
Goodey, T., & Wellings, A. W., 53.
Goodhue, E. S., 402.
Gottheil, 406.
de Goyon, J., & Bouvier, J. E., 306.
Graham, D., 270.
Graham-Smith, G. S., with Foreman, 236.
Grall, 284.
de Granada, S. H., 225.
Greggio, G., 161.
Grieg, E. D. W., 115, 118, 230.
Grenada, 103.
Griffin, W. B., 297.
Griffiths, T. H. D., with Le Prince, 37.
Grothusen, 223.
Guatemala, 108.
Guerrini, G., 113.
Gupta, J. J. R., 93.

H.

Haas, T. D., with Derivaux & Taylor, 304.
Haberfeld, W., 52, 55.
Haguenau, J., with Loygue, 55.
Hakansson, E. G., with Butler, 217.
Halberkann, J., with Giemsa, 299.
Hall, M. C., 82.
——, & Foster, W. D., 98.
Hartmann, H., & Zila, L., 299.
——, M., 166.
Hata, H., 460.
Hatiegan, J., & Doeri, B., 300.
Hayashi, N., 194.
von Heinrich, H., 284.
Heinrichsdorff, 267.
Heiser, V. G., 99.
Hendley, H., 280.
Henry, H., 431.
d'Hérelle, F., 262.
Hess, A. F., & Unger, L. J., 221.
Hiatt, H. B., 279.
Hicks, J. R., 125.

Hill, C. H., 388.
——, G. F., 237.
Hirschfeld, L., 309.
Hirst, L. F., 183.
Histrowitz, H., 18.
von Hoesslin, H., 200.
Hoffmann, E., 406
——, F. L., 15.
Hollande, A. C., & Fumey, M., 263.
van Hoof, L., 197.
Hooker, S. B., 446.
Horák, O., 438.
Hovasse with Cot, 307.
Howell, A., 271.
Huebener, E., 207.
Huelse, W., 309.
Hulshoff Pol, D. T., 180.
Hulton-Frankel, F., & MacDonald, K., 444.
Hume, E. H., 88.
——, E. M., with Chick, 174, 175.
Hunziker, 258.
Hurst, A. F., 265.
Husk, C. E., with Olitsky & Denzer, 127, 136.

I.

Ido, Y., Ito, H., Wani, H., & Okuda, K., 190.
Inada, 208.
Ingram, A., 95, 308.
Innes, A., with Chalmers, 398.
Ito, H., with Ido, Wani & Okuda, 190.
——, T., & Matsusaki, H., 208.
Iturbe, J., 79.
Iwano, S., 220.
Izumi, G., & Kato, M., 192.

J.

Jacob, L., 58.
James, S. P., 21, 289.
Janicki, C., 93.
Jarno, L., 39
Jeanselme, E., 19, 30.
Jepps, M. W., & Meakins, J. C., 247.
Jimura, Y., 122.
Job, E., 41.
Jobling, J. W., & Eggstein, A. A., 205.
Johnston, J. A., with Crowell, 119.
——, J. E. L., 418.
de Jong, S. I., & Martin, A., 304.
Jonomura, K., with Yamaguchi & Koizumi, 182.
Jonin, A., 226.
Journal of the Royal Army Medical Corps, 19.

K.

Kabelik, J., 283.
Kamar, A., with Chalmers, 398.
——, A. E., 295.
Kaneko, R., & Okuda, K., 189, 208.
Kato, M., with Izumi, 192.
Kaunitz, P., & Trawinski, A., 185.
Kauntze, W. H., with Ross, 60.
Keller, 286.
Kelly, F. L., & Geiger, J. C., 7.
Kelso, R. F., with Sadler, 270.
Kennard, C. P., 87.
de Kerdrel, A., with Ravaut, 24.
——, with ——, Reniac & Krolunitsky, 8.
Kermorgant, 216.
Kimmerle, 58.
Kimura, G., 304.
King, H. H., with Chalmers, 393.
——, W. W., 387.
——, W. O. R., with Waddell, Banks & Watson, 50
——, W. V., 187.
Kirschbaum, 12.
Kisskalt, K., 283.
Kitagawa, J., 193.
——, & Mukoyama, T., 189.
Knowles, F. C., 400.
Kobayashi, H., 73.
Koch, E. W., with Walters & Baker, 250.
——, J., 196.
Koizumi, M., with Yamaguchi & Jonomura, 182.
——, S., 172.
Kon, Y., & Okazaki, 181.
de Korté, W. E., 391.
Kostoff, K. H., 202.
Kothary, P. T., 94.
Krahelska, M., with Dadej, 139.
Kraus, R., 404.
——, & Rosenbusch, F., 166.
Krediet, G. J., 121.
Krempl, A., 427.
Kritzler, 400.
Krolunitsky, with Ravaut, Reniac, & de Kerdrel, 8.
Kruse, 266.
Kuczynski, M. H., 164.
Kuelz, L., 199.
Kuenen, W. A., & Swellengrebel, N. H., 417.
Kulka, W., 273.

L.

Labadens, 308.
Labbé, M., 310.
Lacassagne, A., 288.
Lagriffoul, A., & Picard, F., 288.
Lamb, A. R., with Gay, 452.
Lambert, A. C., 248.
Lamoureux, A., 11.
Lane, C., 82.
Lanfranchi, A., 422.
de Langen, C. D., & Schut, H., 221.
—— & —— J., 414.
Langer-Zuckerkandl, H., with Baumgarten, 116.
Lankester, A., 413.
Laroche, G., with Mazet, 457.

Lassalle, C. F., 6.
Laveran, A., 70, 155, 163.
Ledingham, J. C. G., & Wenyon, C. M., 65.
Leger & Ryckewaert, P., 295.
——, L., & Mouriquand, G., 37, 310.
——, M., 7, 89, 96, 401, 415, 417.
——, & Mouzels, P., 392, 430.
Lehotay, K., 310.
Leiner, C., 296.
Leiper, R. T., 99.
Lemaire, H., with Armand-Delille & Gassin, 197.
——, with —— & Paisseau, 40, 48, 453.
——, with Paisseau, 16.
Le Prince, J. A., & Griffitts, T. H. D., 37.
Leroy, E., with Fiessinger, 268.
Le Roy des Barres, 458.
Levi della Vida, M., 258.
Levy, M. D., & Wall, D. P., 29, 94.
Lie, H. P., 402.
Lillie, D. G., & Shepheard, S., 50.
Liston, W. G., 211.
Loew, J., 255.
Loewenthal, W., with Ditthorn, 59.
Loiselet, M., 415.
Longo, A., 153.
Low, G. C., 227, 431.
Loygue, G., & Haguenau, J., 55.
Ludwig, 185.
Lutz, A., 78.

M.

MacAdam, W., 243.
MacCallum, W. G., 405.
McCoy, G. W., 403
——, & Neill, M. H., 135.
McCrea, H. M., 207.
MacDonald, K., with Hulton-Frankel, 444.
Macfie, J. W. S., 88, 162, 203, 210, 220, 229, 238, 396.
——, with Stephens, Yorke, Blacklock, Cooper & Carter, 26, 27, 298.
MacGilchrist, A. C., 296.
Mackie, T. J., 444.
Mackinnon, D. L., with Carter, Matthews, Smith & Stephens, 46.
McMullin, J. J. A., with Vickery, 255.
McNair, J. B., 392.
McNeil, H. L., 62.
McWalter, J. C., 294.
Maer, C. M. A., 255.
Magner, W., 65.
Majoli, A., & Paoletti, F., 17.
Malcolm, R. A. G., 388.
Maldonado, I., with Morel, 77.
van Malleghem, R., with Wurtz., 295.
Malleterre, F., with Florand, 68.
Malloizel & Bonnard, 289.
Manalang, C., 179.
Manaud, A., 301.
Manlove, C. H., 274.
Manson, P., 313.
Marchand, L., 294.
Marchoux, E., 20, 288.
Margolis, A., 60.
Mariano, F., 182.
Marris, H. F., 432.
Martens, 272.
Martin, A., with de Jong, 304
Martin, C. J., & Williams, F. E., 261.
Martinez, F. F., 245.
Martoglio, F., 422.
Marty, L., 54.
Mason, E. H., 435.
de Massary, E., & Tockmann, 310
Masters, W. E., 84.
Mathis & Mercier, L., 53, 54, 255.
——, C., with Mercier, 253.
Matsuoka, Y., 98.
Matsusaki, H., with Ito, 208.
da Matta, A. A., 89
Mattei, C., 48, 227.
——, & Bloch, M., 55.
——, & Ribon, E., 228.
Matthews, J. R., with Carter, H. F., 46.
——, with Carter, Mackinnon, Smith & Stephens, 46.
——, with Smith, 47.
Mayer, M., 196, 222.
Mazet, with Laroche, 457.
Meakins, J. C., with Jepps, 247.
Medical Missions in India, 218.
Medical Research Committee, 64, 432.
Meier Flégel, E., 407.
Mellanby, E., 271.
de Mello, 36, 54, 55, 61, 83.
——, F., & Menezes, C. F., 191.
Meltzer, 308.
Memmi, G., 309.
Mendoza-Guazon, M. P., 215.
Menezes, C. F., with de Mello, 191.
Menon, T. K., with Cornwall, 143, 459.
Mercier, L., & Mathis, C., 253.
——, with ——, 53, 54, 255.
Mesnil, F., & Roubaud, E., 33.
Meyer, K. A., with Gauss, 169.
Michaelis, L., 263.
Michel, C., 277, 278.
Mida, M., 257.
Miescher, G., 390.
Migliorini, 293.
Miller, C. H., 432.
Mirguet, 457.
Mitchell, J. A., 127.
Mitzmain, M. B., 32.
Miyajima, M., & Okumura, T., 194.
Mola, G., 282.
Monier-Vinard & Caillé, 15.
Montez, J., 310.
Montpellier, J., 30.
Moorhead, T. G., with Shearman, 183.
Moreau, L., 54, 290, 293, 295.
Morel, L., & Maldonado, I., 77.
Moses, A., 227.
Moulinier, 299.
Mouriquand, G., with Léger, 37, 310.

Mouriz, J., with Murillo, 118.
Mouzels, P., with Léger, 392, 430.
Muehlens, 285.
——, P., 202.
Mueller, J. H., with Pappenheimer & Vermilye, 430.
Muir, E., 151.
Mukoyama, T., with Kitagawa, 180.
Mumemoto, E., with Niowaka & Yoshizawa, 192.
Munk, F., 286.
Murakami, F., 397.
Murillo, F., & Mouriz, J., 118.
Muto, M., 76.

N.

Nakagawa, K., 74.
Nègre, L., 59
Neill, M. H., 141.
——, with McCoy, 135.
Nemoto, T., with Yoshikawa & Yano, 179.
Netter, L., 302, 303.
Neuber, B., 140.
Neuschlosz, S., 25.
Neveu, R., with Salomon, 75.
Newham, H. B., 14.
——, with Daniels, 240, 315.
Nicaragua, 109.
Nicholls, L., 119.
Nicholson, M. A., 171.
Nicolle, Raphael, A., & Debains, E., 442.
——, C., 141, 153.
Nijland, A. H., 212.
Niowaka, I., Yoshizawa, I., & Mumemoto, E., 192.
Nobécourt, P., 269.
Noc, F., 247.
Noguchi, H., 204.
Nowicki, W., 264.
Nowlin, N., 54.
Nozoe, M., 112.
Nuttall, G. H. F., 195, 236.

O.

O'Connor, F. W., with Wenyon, 43, 314.
Oehler, R., 253.
Ohno, T., 392.
Okazaki, M., with Kon, 181.
Okuda, K., with Ido, Ito & Wani, 190.
——, with Kaneko, 189, 208.
Okumura, T., with Miyajima, 194.
Olitsky, P. K., 135.
——, Denzer, B. S., & Husk, C. E., 127, 136.
——, with Plotz & Baehr, 141.
Orenstein, A. J., & Watkins-Pitchford, W., 28.
Orticoni, A., 132.
Osler, W., 14.
Otten, L., 460.
Otto, R., & Dietrich, 137.

P.

Pain, F., 388.
Paisseau, G., with Armand-Delille, & Lemaire, 40, 48, 453.
——, & Lemaire, H., 16.
Palk, C. L., & Bryson, R., 404.
Panama, 109.
Paneth, L., 135.
Panganiban, C. S., with Schoebl, 120.
Paoletti, F., with Majoli, 17.
Pappenheimer, A. M., 430.
——, Vermilye, H. N., & Mueller, J. H., 430.
Paris, P., 30.
Parker, R. R., & Wells, R. W., 187.
Parrot, L., 201, 414.
Parry, R. C., 463.
Pasquier, C. R., with Garin, 292, 293.
Patanè, C., 145.
Paul, C. N., 388.
Pava, C. M., 228.
Peacock, W. L., 222.
Pekkola, W., with Chalmers, 63, 419, 421.
Pende, N., 25.
Pernet, G., 406.
Picard, F., with Lagriffoul, 288.
Pielsticker, F., 287.
Pijper, A., 388, 395, 397.
Pissavy, A., & Quiquandon, J., 18.
Pittaluga, G., & de Buen, S., 238.
Plotz, H., Olitsky, P. K., & Baehr, G., 141
Pondman, A., 191.
Ponselle, A., 164.
Popper, H., 246.
Portocalis, 197.
Porto Carrero, J., 87
Potel, R., 131.
Potts, J. L., 77.
Pouget, with Garin & Sarrouy, 292.
Pribram, E., 261.
Priestley, H., 388.
—— with Breinl, 90.
Puglisi-Allegra, S., 206.
Punjab, 280.
Pupo, J. de A., 389.
Pyman, F. L., & Wenyon, C. M., 249.

Q.

Querens, P. L., 74.
Quiquandon, J., with Pissavy, 18.

R.

de Raadt, O. L. E., 40, 116, 462, 463.
Rangel Pestana, B., 67.
Raphael, E., with Nicolle & Debains, 442.
Rathery, F., 57.
Ravaut, P., & de Kerdrel, A., 24.
——, Reniac, de Kerdrel & Krolunitsky, 8.

Raymond, V., 289.
Razetti, L., 55.
Razzak, A., 300.
Redewell, F. H., 127.
Reichenow, E., 35.
Reinhard, P., 34.
Reniac, with Ravaut, de Kerdrel & Krolunitsky, 8.
Ribeyro, R. E., with Arce, 209.
Ribon, E., with Mattei, 228.
Richardson, C. W., 17.
Robertson, M., 123, 142.
da Rocha-Lima, H., 137.
Roche, M., 306.
Rockefeller Foundation, 100, 107.
Rodhain, J., & Van den Branden, F., 33, 425.
von Roemer, L. S. A. M., 113.
Rogers, L., 23, 113, 145, 297, 407.
Rose, F. G., 67, 91.
——, W., 100.
Rosenbusch, F., with Kraus, 166.
Ross, P. H., & Kauntze, W. H., 60.
Rossi, G., 282.
Roth, O., 397.
Roubaud, 14, 32, 36.
——, with Mesnil, 33.
Rousseau, P., 289.
Row, R., 144.
de Ruyter, J., 224.
Ryckewaert, P., with Leger, 295.

S.

Sadler, W., & Kelso, R. F., 270.
St. Lucia, 104.
St. Vincent., 105.
Sakagami, K., 455.
Sakurane, K., 397.
Salomon & Neveu, R., 75.
Salvador, 109.
Sameshima, K., 469.
Sangiorgi, G., 204, 250.
Sano, B., with Yamano & Ashigawa, 209.
Sarrouy with Garin, 292.
—— with —— & Pouget, 292.
Savage, R. E., & Young, J. R., 49.
Saylor, P. D., with Bowman, 97.
Schiff, F., 130.
Schilling, C., 301.
Schmitz, F., 393.
——, K. E. F., 260.
Schoebl, O., 120.
——, & Panganiban, C. S., 120.
Schroeder, A., 272.
Schuerer, J., & Stern, W., 139.
Schultz, W., 60.
Schut, H., with de Langen, 221.
——, J., 414.
——, with de Langen, 414.
Schwetz, 167, 168.
Scott, L. B., 154.
Sellards, A. W., 158.
Senevet, G., 37.
——, with Abrami, 4.
Senftner, H. F., with Cumming, 126.
Sergent, Ed. & Sergent, Et., 8.
——, Et., 8, 430.
Seymour, L. W., 69.
Shaklee, A. O., 171.
Shearman, C. H., & Moorhead, T. G., 183.
Shepheard, S., with Lillie, 50.
Siler, J. F., & Cole, C. L., 84.
Silva, F., 395.
da Silva, R., 62.
Simpson, F., with Creel, 464.
——, W. J., 234.
Simpson-Wells, A., 281.
Sinclair, C. G., with Foster, 84.
Sinton, J. A., 24, 154.
Skalski & Sterling, 61.
Skrjabin, K. I., 92.
Sloan, M. F., 416.
Sluka, E., & Strisower, R., 438.
Smith, A. M., & Matthews, J. R., 47.
——, with Carter, Mackinnon, Matthews & Stephens, 46.
Smits, J. C. J. C., 218.
Sontag, F., with Bien, 140.
Sordelli, A., & Fischer, H., 409.
Sotiriadès, 302.
Soucek, A., with Weil, 129.
de Sousa, L., 191.
Souter, C. H., 388.
Speares, J., 246.
Spick, 394.
Spittel, R. L., 408.
Sprawson, C. A., with Cochrane, 411.
——, with Crowe, 72.
Stannus, H. S., 388.
Starkenstein, E., 124.
Steber, 83.
Stefko, W., 182, 429.
Stephens, J. W. W., with Carter, Mackinnon, Matthews & Smith, 46.
——, Yorke, W., Blacklock, B., Macfie, J. W. S., Cooper, C. F., & Carter, H. F., 26, 27, 298.
Sterling with Skalski, 61.
——, K., with Sterling, 138.
——, S., & Sterling, K., 138.
Stern, W., with Schuerer, 139.
Stettner, E., 68.
Stévenel, L., 408.
Stevens, I. M., with Force, 452.
Stevenson, A. C., 303.
Stewart, F. H., 81, 82.
Stiles, C. W., 85.
Stockman, R., 224.
Stransky, E., with von Darányi, 264.
Strisower, R., with Sluka, 438.
Sukegawa, K., 469.
Suldey, E. W., 223, 280.
Susu, B. J., 153.
Suzuki, K., 89.
——, T., 180.
Sweet, E. M., 229.

Swellengrebel, N. H., 420.
——, with Kuenen, 417.
Synwoldt, J., 129.

T.

Taiwan Igakukai Zasshi, 52.
Takahashi, S., 399.
Takano, R., 454.
——, & Yabe, S., 114.
Takatsuki, 239.
Talbot, A., 232.
Tasker, A. N., with Chace, 62.
Taylor, F. E., 451.
——, H. A., 36.
——, with Derivaux & Haas, 304.
Teague, O., with Drennan, 468.
Teichmann, E., 162.
——, F., 21.
Terburgh, J. T., 231.
Thomson, D., 3.
——, J. D., 1.
Tielemann, E. T., with Unna, 52.
Tockmann with de Massary, 310.
Torrance, R. A., & Bowman, F. H., 41.
Torres, O., 156, 157.
Totsuka, R., 394.
Toyama, I., 391.
Toyoda, S., 203, 454.
Travis, F. M., 178.
Trawinski, A., with Kaunitz, 185.
Trinidad, 6, 106, 107.
Tsuneoka, R., 190.

U.

Ullmann, B., 291.
Umber, 259.
Umnus, O., 207.
Unger, L. J., with Hess, 221.
Unna, P. G., & Tielemann, E. T., 52.
d'Utra e Silva, O., & Arantes, J. B., 428.

V.

Van den Branden, F., 235, 399.
——, with Rodhain, 33, 425.
Velu, H., 429.
Vermilye, H. N., with Pappenheimer & Mueller, 430.
Vickery, E. A., & McMullin, J. J. A., 255.
Villa Alvarez, A., 63.
Viteček, V., 138.
Vogel, R., 307.
Vogt, V., 225.

W.

Waddell, W., Banks, C., Watson, H., & King, W. O. R., 50.
Wakisaka, F., 232.
Walker, E. L., 156.
——, & Emrich, W., 51.
——, E. W. A., with Dreyer, Gardner & Gibson, 454.
Wall, D. P., with Levy, 29, 94.
Walters, A. L., Baker, W. F., & Koch, E. W., 250.
Wani, H., with Ido, Ito & Okuda, 190.
Wanless, W. J., 411.
Washburn, B. E., 86.
Waterfield, N. E., 278.
Waters, E., 470.
Watkins-Pitchford, W., with Orenstein, 28.
Watson, H., with Waddell, Banks & King, 50.
Weber, R., 122.
Weil, E., & Soucek, A., 120.
Wellings, A. W., with Goodey, 53.
Wells, R. W., with Parker, 187.
Wenyon, C. M., with Ledingham, 65.
——, & O'Connor, F. W., 43, 314.
——, with Pyman, 249.
Werner, H., 11, 39.
Wiener, 42, 129.
——, E., 201.
Wilcox, R. L., 14.
Wilkinson, E., 412.
Willcox, W. H., 234.
Williams, F. E., with Martin, 261.
Williamson, R., with Cutler, 250.
Willis, H., 30.
Woodcock, H. M., 44.
Wright, L. T., 225.
——, T. E., 41.
Wurmfeld, A., 23.
Wurtz, 38.
——, R., & van Malleghem, R., 295.

Y.

Yabe, S., with Takano, 114.
Yamaguchi, K., Koizumi, M., & Jonomura, K., 182.
Yamano, W., Sano B., & Ashigawa, B., 209.
Yano, K., with Yoshikawa & Nemoto, 179.
Yorke, W., & Blacklock, B., 90.
——, with Stephens, Blacklock, Macfie, Cooper & Carter, 26, 27, 298.
Yoshida, S., 94.
Yoshikawa, I., Yano, K., & Nemoto, T., 179.
Yoshizawa, T., with Niowaka & Mumemoto, E., 192.
Young, J. R., with Savage, 49.

Z.

Zeiss, H., 140.
Zila, L., with Hartmann, 299.
Zuelzer, G., 293.

INDEX OF SUBJECTS.

Compiled by Miss M. H James.

The Sanitation Number (5) is indexed separately, as **Applied Hygiene in the Tropics,** and this Index follows the Index of Subjects.

- **Abscess, Hepatic,** *see* Liver Abscess, under **AMOEBIASIS**

- **AMOEBIASIS** (Amoebic Dysentery *and* Liver Abscess, *see also* **DYSENTERY**), 43–69, 243–75
  - Amoebiasis
    - Acute: Treatment, 43
    - Amoebic Infection: Need for Investigating, 45
    - Amoebo-Bacillary Infection with *B. para. A*, 268–9
      - Diagnostic Difficulties, 269
    - Blood Conditions: Leucocyte Counts, Differential, 218
    - Bowel Ulceration, 210
    - Carriers of Cysts
      - Amoebae and other Protozoa found in, 47, 51–2
      - Constipation in, 255
      - Treatment by
        - Emetine hydrochloride, 43
        - Ol. Chenop., 51–2
      - With and without History of Dysentery, 243–4
      - *E. histolytica* Cysts
        - Percentages with and without History of the Disease, 243–4
        - Results with various forms of Treatment, 49–50, 50–51
        - Treatment by Ol. Chenop., 51–2
    - Chemotherapy, *see also* Emetine, *and* Treatment
      - Alkaloids (Emetine Derivatives and others), Action of, on *E. histolytica* in Kittens, 248–9
      - Ipecac. Alkaloids and Synthetic Derivatives of Cephaline; Action of, on *E. buccalis* and Paramoecia, 250

Amoebiasis—*cont.*
- Amoebiasis—*cont.*
  - Complication of Malaria in Armies in the Field, 268
  - Concentration Method for Cysts, in Stool Examination, 46–7
  - Diagnosis and Diagnostic Methods, 256
    - Laboratory Methods, 274
    - Sole Safe Guide, 45
  - Emetine, *see also under* Treatment
    - Action of, on
      - Amoebae of Experimentally Infected Kittens, 248–9
      - Hosts rather than Amoebae, suggested, 249
    - Derivatives of, Action of, on Amoebae, 249
    - Effect in Cases of Irritable Heart, 247
    - Limitations of, 214
    - Urinary Elimination of, 228
  - Experimental Infection by Filtered Faeces, 244–5
  - Experimental Work with Flies, &c., 43, 44
  - Faeces of: Atypical: Described in Terms of Food-Stuffs, 55
  - Hepatitis
    - in Convalescence, 271
    - Diagnostic Methods, 246
  - Incidence
    - Age, 215
    - Class, Troops, 43, 44, 45, 46, 48, 214, 247, 261, 268
    - Geographical
      - Adriatic Coast, 255
      - Balkan Zone, 214
      - Brazil, 51
      - China (Shanghai), 66
      - Congo Region, 54
      - Eastern Fronts, 65
      - Eastern Regions, 45
      - Ecuador, 218
      - Egypt, 43, 44, 45, 261

- **Amoebiasis**—*cont.*
  - AMOEBIASIS—*cont.*
    - Incidence—*cont.*
      - Geographical—*cont.*
        - England
          - Liverpool: from French Front, 46
        - France, 268
          - Autochthonous, 48
          - Epidemic, 48
          - in Returned Troops, 45
        - French Front, 46, 47, 48
        - Galicia, 246
        - Gallipoli, 45
        - India, 243
        - Indo-China (Saigon), 247
        - Lybia, 244
        - Macedonia, 244
        - Mesopotamia, 65, 243
        - Philippine Islands, 215
        - Spain, 245–6
      - Race, 43, 44, 45, 243, 248
    - Kidney Conditions in Relation to, 48
    - Mixed Infection with Amoebae and Bacilli, Shanghai, 66
    - Onset after Anti-Typhoid Vaccinations, 217

    - ORAL, Gingivitis, Pyorrhoea, &c.
      - Protozoal Parasites
        - Amoebae and Entamoebae
          - *E. buccalis*: Multiplication and Periodicity of, and Tissue Invasion by, 54
            - and Paramoecia, Action on, of Ipecac. Alkaloids, and Synthetic Derivatives of Cephaline, 250
          - *E. gingivalis* Food of, 53
            - Non-Pathogenicity of, 53
        - Tetratrichomonas
          - *T. buccalis* n. sp.; Morphology, 53, 54

    - Prophylaxis
      - Against
        - Infection, 247
        - Relapse, 247
      - in regard to Cysts, 252
    - Protozoological Investigation at Liverpool: Results, 46–7
    - Protozoal Parasites associated with
      - Amoebae and Entamoebae
        - Action on, of Emetine Derivatives, 249
        - Chromidia of Cysts, and Siderophile Rods as Diagnostic Points, 53
        - Culture of, on Pure Media, 253–4

- **Amoebiasis**—*cont.*
  - AMOEBIASIS—*cont.*
    - Protozoal Parasites Associated with—*cont.*
      - Amoebae and Entamoebae—*cont.*
        - Cysts
          - Chromidia in, 53, 246, 255
          - Diagnosis of, 246
          - in French Cases, 268
          - I Cysts: Egypt, 43
          - Resistance of, to Disinfectants, &c., Experiments on, 43, 44
          - Staining Methods, 52–3, 250
          - Variable Characteristics of, 246
          - Vegetative Stage of, 253
            - Diagnosis of, 255
        - Development of, in Culture with Various Bacteria, 253–4
        - Diagnosis of, by means of their Cysts, 52
        - Differentiation of Histological Points, 53
        - Encysted: Diagnostic Difficulties, 55
        - Pathogenic in Faeces: France, in Returned Troops, 45
        - Present in Carriers (*q.v.*, *supra*), Varieties found, 47
        - Remarks on, 45
        - Resistant to Alcresta Treatment, &c., 46
        - Vitality at Different Temperatures, 52
        - *A. limax*, Effects on, of Various Reagents, 52
        - *E. coli, see also E. dysenteriae* and, *infra*
          - Action on, of Emetine, 54
          - in British and Indian Troops, 44
          - in Non-Dysenteric Cases, 47
          - Cysts
            - Staining Methods, 250
            - with more than 8 Nuclei; Nature of, 253
        - *E. coli* and *Chilomastix mesnili* in Mixed Infections, 420
          - Occasional Toxicity, 245
          - Percentage of, in Liverpool Cases, 46
          - Treatment; Relapse after, 43
        - *E. coli* and *E. histolytica* Cysts
          - Bodies found in; Origin discussed, 255
            - Differentiation of, 246
              - of Amoeboid Forms: Rapid Method, 250-1

- **Amoebiasis**—*cont.*
  - AMOEBIASIS—*cont.*
    - Protozoal Parasites Associated—*cont.*
      - Amoebae and Entamoebae—*cont.*
        - *E. coli*-like, in Lizard, 44
        - *E. dysenteriae*, Alone, and in Conjunction with other Protozoa, and Helminths, 67
          - Infection, Experimental, in Guinea-pigs: Characteristics, 251
          - "Strains of," do they exist? 54
        - *E. dysenteriae* and *coli*; Siderophile rods of the former as Diagnostic Point, 53
        - *E. dysenteriae* (*dissenterica*) Cysts; Staining Methods, 250
        - *E. dysenteriae europaeae*, n. sp., in Galicia, 246
        - *E. histolytica, see also* Cysts of, *supra, and E. coli and*
          - in Cases of Irritable Heart; Detection and Treatment, 247
          - Cysts
            - Concentration Method for Demonstrating in Faeces, 46-7
            - Destroyed by
              - Cresol, 44
              - Drying, 44
            - in Indian Troops, 45
            - Maturation, Viability, &c., of, in relation to Prophylaxis, 252
            - in Mixed Infections, 420
            - Mode, Place and Time of Liberation of Contents, when Ingested by Cats, 252
            - Morphology, and Physiology of; Practical Deductions from, 252
            - Persistence and Recurrence, 243, 244
          - and *E. minuta*, 417
          - in Faeces: Accra, 210
          - Infection, 43, 51–2
            - Experimental, 44
              - in Kittens: Therapeutic Experiments with Various Alkaloids, 248–9
            - Fly-spread, 265
            - from French Front; Treatment, 46
            - Treatment by Various Forms of Emetine: Results, 49–51
- **Amoebiasis**—*cont.*
  - AMOEBIASIS—*cont.*
    - Protozoal Parasites Associated with—*cont.*
      - Amoebae and Entamoebae—*cont.*
        - *E. histolytica*—*cont.*
          - Occurrence, in British and Indian Troops, 44–5
          - Percentage in
            - Cases from France, 47
            - Liverpool Cases, 46
          - in Stools: Egypt, 261
        - *E. hominis*, also Cysts of, in Faeces, 67
        - *E. minuta* and *E. tenuis*, 417
        - *E. minutissima* n. sp.: Differentiation of, from *Vahlkampfia nana*, and *E. histolytica*, 252
        - *E. nana*: Nomenclature, 252
        - *E. ranarum* Cysts; Stages, Sizes, Nuclei, Schizogony, 253
        - *E. serpentis* n. sp.; where found. Various Forms, 53
        - *E. tenuis*, n. sp. Cysts of, 417
      - Limax, Classification by Types, 417
      - *Loeschia coli, see E. coli, under* Amoebae and Entamoebae, *supra*
      - Paramoecia, *see E. buccalis* and, *under* Amoebae, *supra*
      - *Vahlkampfia nana*, Suggested Name for *E. nana*, 252
    - Rarity of, in Middle East, 65
    - References to Literature, i-iii, xli-iii
    - Relapses, 43, 46
    - Stool-Examination, Precautions as to Identity of Stool, 50
    - Summary of Knowledge on, 245
    - Symptoms, 45, 48, 255, 268
    - Transmission by
      - Carriers (*q.v., supra*), 48
      - Flies, 265
      - Stools of Convalescent and Contact Carriers, 265
    - Temperature; Diagnostic Value, 246
    - Treatment
      - Experiments on Kittens; Alkaloids employed, 248
      - Hints on, 48
      - Various Methods, 45
        - Alcresta, in various combinations, 46, 47
        - Bismuth Salicylate, 43
        - Carpentier and De La Mothe method, 68
        - Dover's Powder, 61
        - Emetine (*q.v., supra*), *passim*
          - Bismuth Iodide, 46–7, 49–50, 51, 227

- **Amoebiasis**—*cont.*
  - AMOEBIASIS—*cont.*
    - Treatment—*cont.*
      - Various Methods—*cont.*
        - Emetine—*cont.*
          - Hydrochloride Injections, 248
          - Various Forms, variously administered, 43, 45, 48, 55, 268, 269
        - Ipecac., *Extrait total glutinisée*, 247
        - Methyl-psychotrine, 218
        - Ol. Chenop., 51-2, 99
  - LIVER ABSCESS
    - Absence of Dysenteric Symptoms, 48
    - Amoebae in, in French Case, 48
    - Autochthonous; France, 48
    - Diagnostic Hints, 246
    - Incidence,
      - Age, 254
      - Class, 48
      - Geographical
        - France, 48
          - Autochthonous, 54
        - Philippines, 254
      - Occupational, 254
      - Locale, Race, Season, and Sex, 254
    - Misdiagnosis of, for Malaria, 10
    - Post-mortem Findings, 227
    - References to Literature, i-ii, xli
    - Subtertian Malaria Simulating: Ceylon, 10
    - Temperature Irregularities in, 54
    - Treatment by
      - Emetine, 48, 55, 268
      - Rogers' Method, 55
    - Without Amoebae in Pus, 54

- **Anaemia, Pernicious,** Malaria resembling; Balkan Regions, 9

- **Ankylostomiasis,** *see under* **HELMINTHIASIS**

- **Ascariasis,** *see under* **HELMINTHIASIS**

- **BERIBERI and Polyneuritis Avium,** 174–81
  - Blood Conditions
    - Differential Leucocyte Count, 180
    - Studies of, 179
    - Urea Retention, 170
  - Cereals and Wheat in relation to
    - Nutritive Properties Determined, 174–5
    - Vitamines of
      - Effect on, of Heat, 174–5
      - Store-place of, in Grains, 174

- **Beriberi**—*cont.*
  - Etiological Theories
    - Auto-intoxication, 178
    - Deficiency, 175
  - Food-Stuffs (*see also* Cereals, *supra*, *and* Rice, *infra*) as Preventives Relative Values of (*table*), 177
  - Incidence: All Forms
    - Age, 216
    - Class, 171, 187, 234
    - Geographical
      - America, U.S., 178
      - Balkan-Adriatic region, 214
      - Borneo, North, 178
      - China, 180
      - Dardanelles, 174
      - Mesopotamia, 174, 176, 234
      - Philippine Islands, 179
      - Spain (First Case), 245
    - Race, 234
    - Season, 216
  - INFANTILE
    - Amino-Acids in Urine in, 180
    - Forms of, 178-9
      - Pseudomeningitic: Cure by Tiqui-tiqui Extract, 179
    - Incidence
      - Age, 216
      - Geographical
        - Philippines, 216
      - Season, 216
  - Nerve Degeneration in, in relation to Diagnosis, 179
  - POLYNEURITIS AVIUM
    - Cure by X Acid, 180-1
    - Food Substances, and Amounts needed, to Prevent and Cure, 174-5 (*table*), 177
    - Partial Inanition in relation to, on Rice Diet, 181
  - Treatment by Wheat Germ in Polished Rice Diet, 174
  - Prophylaxis
    - Dietary, 174, 175, 178, 234
    - Yeast Extract, 234
  - References to Literature, iii-iv, xliii-iv
  - Rice in relation to, 175, 178, 181, 216
  - Symptoms, 178, 179
  - Treatment, 178
    - X Acid, 180–1
  - Urea-Retention in, 179
  - Vitamines
    - Amount Contained in Various Cereals, 174
    - High Temperatures as Affecting, 174–5
  - Wet Form; Malaria Simulating; Balkan Regions, 9

- **Balantidiasis,** *see* **Dysentery,** CILIATE

Bilharziasis, *see* SCHISTOSOMIASIS, *under* **HELMINTHIASIS**

Biting Arthropods and Ticks, *see* **ENTOMOLOGICAL REFERENCES**

Black Fever, of the Transkei, *see under* **TYPHUS**

Blackwater Fever, 40–2
- Acid Intoxication Theory, 41
- Blood Phenomena, 40
  - Arneth Counts, 229
  - Complement-Increase due to Quinine, in relation to Onset, 40
  - Haemoglobinaemia, 42
  - Haemolytic Process: Causes, &c., 40, 41
- Fatality, 40
- Incidence
  - Class (Troops), 40, 42
  - Geographical
    - Albania, 12
    - Balkan-Adriatic region, 214
    - Haiti, 41
    - Macedonia, 40
    - Rumania, 287
  - Race, 40
- Malaria in relation to, 9, 40, 41, 42
- Paroxysmal Haemoglobinuria, Complement Evanishment in, 40–1
- Predisposing Conditions, 40
- Quinine, Complement Increase due to, in relation to Onset, 40
- References to Literature, iv, xliv
- Symptoms (*see also* Blood Phenomena, *supra*), 40, 41, 42
  - Most Menacing, 41
- Temperature, Atmospheric, in relation to, 40
- Tertian and Subtertian Malaria Parasites in; Albania, 42
- Treatment
  - Hint for, 40
  - Methods and Means
    - Calomel, 41
    - Quinine, 41–2
    - Rest in Bed, 41
    - Sod. bicarb., 41
    - Turpentine, 41
- Urine Phenomena, 40

Books Reviewed, *see* **REVIEWS OF BOOKS**

Brill's Disease, *see under* **TYPHUS**

Camp Jaundice, *see under* **Jaundice**

Cat-Bite Disease, *see under* **Rat-Bite Fever**

Cerebro-Spinal Meningitis
- Fatality of Cases among Blacks in France, 226
- Diplococcus, Intracellular, in Madagascan Cases, 223
- Incidence
  - Geographical
    - France, Southern, 226
    - Madagascar, 223
  - Race, 223, 226
- Malaria Simulating, 295, 310
- Treatment, 223

Cestode Infections, *see under* **HELMINTHIASIS**

Chagas's Disease, *see* TRYPANOSOMIASIS, HUMAN, AMERICAN, *under* **SLEEPING SICKNESS**

CHOLERA, 113–22
- *Ascaris lumbricoides* in relation to; Philippines, 216
- Bacteriology
  - Bacterial Diagnosis
    - Methods
      - Bandi's, 115, 116
      - De Raadt's, 116
      - Castellani's, 115–16
  - Bacteriological Results of Stool Examinations; Calcutta, 115
  - Selective Media, 116–17; (*diagrams*), 117
  - Vibrio Toxins; Researches on, 120–1
  - Vibrios
    - *V. cholerae*
      - in Bile, Gall, and Faeces, 119
      - Chemical Affinities, 119
      - Distribution, in Experimental Carriers as affected by Bile, 120
      - and El Tor Vibrios, Specific Determination of: Test, 118
      - Isolation Method of Castellani, 115–16
      - in Stools, Calcutta, 115
    - *V. kadikjöji* Toxin; Experiments with, 120–1
    - Vibrios Resembling *V. cholerae*
      - Bacteriological Investigation of, 119
      - Mutations of, and Attempts to Differentiate, 118
      - Serological Investigation of, 118
      - in Stools, Calcutta, 115
- Bibliography, 119

Cholera—*cont.*
- Carriers and Convalescents, Helminths present in, 113, 216
  - Experimental
    - Immunity-Experiments on, 120
    - Influence of Bile on Distribution in, of *V. cholerae*, 120
- Choleraic Diarrhoea: Balkan Region; Causation, 214-15
- Diagnosis, Bacteriological, Various Methods, 115-16
- Epidemiology, *see* Incidence, Geographical, *infra*
- Helminth Infections Complicating, 113, 216
- Incidence
  - Age, 215
  - Class, 113
  - Geographical
    - Balkan-Adriatic Zone, 214
    - Batavia (Epidemics of 1913-16), 113, 121
    - India (Calcutta), 115, 118
    - Japan (Epidemic), 122
    - Philippine Islands, 215, 216
- Mortality, With and Without Alkalies, 113-14
- *Oxyuris vermicularis* in relation to, 113
- Paracholera: *V. paracholerae* in Balkan-Adriatic Case, 214
- Prophylaxis
  - Disinfection of Fresh Fish with Dilute Hydrochloric Acid, 122
  - Inoculation or Vaccination, 121
    - Individuality of Response to, 122
    - Results, 113, 114-15, 122
    - Vaccines for
      - Comparisons of, 121-2
      - Mixed, 122
- Pseudo-Cholera, Malarial
  - Balkan regions, 10
  - Ceylon, 10
- Rash; Causation, 114
- References to Literature, iv-v, xliv-v
- Stool-Preservation for Examination; Hints on, 119
- Symptoms, *see* Rash, *supra*
- Treatment by
  - Inoculation, 121
  - Sod. bicarb. Injections, 113, 114
  - Vaccine, Sensitized, 114
- *Trichocephalus trichiuris*: in Relation to, 113
- Uraemia after; Mortality from, With and Without Alkalies, 113-14

Clonorchiasis, *see under* **HELMINTHIASIS**

Dengue, 182
- *Culex fatigans* as Vector, 182
- *Desvoidea obturbans* as Vector, 182
- Incidence
  - Geographical
    - Adrio-Balkanic Region, 213
    - Australia, Northern (Darwin) (Epidemic of 1914), 238
    - Brazil (Epidemic 1916), 182
    - Turkey in Asia, 182
  - Locale, 182
  - Season, 182
- Insect Vectors, 182
- Pappataci Fever Mistaken for: Macedonia, 213
- Post-mortem Findings, 182
- Stegomyia as Vectors,
  - *S. fasciata*, 182, 238
  - *S. scutellaris*, 182

Dermal Leishmaniasis (Tropical Sore), *see under* **KALA AZAR**

Distomiasis, Pulmonary, *see* PARAGONIMIASIS, *under* **HELMINTHIASIS**

Dracontiasis, *see under* **HELMINTHIASIS**

DYSENTERY, BACILLARY, CILIATE, FLAGELLATE, MIXED or UNCLASSED (*see also* **AMOEBIASIS**), 55-69, 255-75
- BACILLARY, 55-61, 255-65
  - Acute
    - Treatment, 256
      - Emetine: Divergent Views, 65
  - Bacteriology
    - Agglutination, 58
      - and Complement Fixation Tests, 57
      - Problems, 262
      - Para-agglutination Phenomena, 57, 262-3
    - Bacilli associated with
      - *B. coli*, in Convalescents, 57
      - *B. dysenteriae*
        - and *B. coli*, Differentiation of, by Combined Albumen Acid Agglutination, 263
        - Differentiation of, by Ovalbuminate of Soda, 263
        - Flexner
          - Agglutination Tests in Diagnosis, 57
          - in French Troops, 55-7, *table*, 56
          - in Infantile Enteritis, 67
          - Nature of Infection, 58
          - in Obstinate Case, 68

Dysentery—*cont.*
- BACILLARY—*cont.*
  - Bacteriology—*cont.*
    - Bacilli associated with—*cont.*
      - *B. dysenteriae*—*cont.*
        - Flexner—*cont.*
          - in Stools after Abdominal Operation, 272
          - in Shanghai Cases, 66
          - in Swiss Cases, 259
        - Flexner and Shiga; Percentages in Salonica Forces, 256
        - Flexner-type, Predominant at Onset of Epidemics, 57
        - Flexner-Y-type Infection; Lodz, 60
        - Forms found in and on
          - Australian Troops in Egypt, 261
          - Eastern and Western Fronts, 265, 267
          - French Troops; Organisms associated with, 55, *table*, 56
          - Quebec Epidemic, 270
          - Salonika, 270
        - Forms prevalent at Onset and later, 57
        - Hiss, in French Troops, 55
        - Infection, Persistent; Treatment by Autogenous Vaccines, 266
        - Morgan's, in Naval Mediterranean Cases, 64
        - Morgan's, No. 1, 67
        - Rarely found in a Field Epidemic (Present War), 273
        - Route of Entry, 260
        - Schmitz, n. sp., Epidemic due to, 260–1
        - Shiga in French Troops, 55–7
          - from Sigmoid Flexure, 259
          - Infection, Septicaemia due to, 255–6
          - in Obstinate Case, 68
          - Ultra-visible Organisms Antagonistic to, 262
        - Shiga type, in Portuguese Case, 256–7
        - Shiga-Kruse, as *the* Causal Agent, 267
          - Infections
            - Achylia gastrica after, 272
            - in Troops, 259
            - Nature of Infection, 58
            - in North Italian Cases, 258
            - in Shanghai Cases, 66

Dysentery—*cont.*
- BACILLARY—*cont.*
  - Bacteriology—*cont.*
    - Bacilli associated with—*cont.*
      - *B. dysenteriae*—*cont.*
        - Shiga-Kruse type
          - Complications (specially Arthritic), due to, 57
          - Predominant in later Stages of Epidemic, 57
        - Y., Epidemic due to among German Troops, 58
          - in Infantile Enteritis, 67
          - in Shanghai Case, 66
          - in Swiss Case, 259
      - *B. dysenteriae* group; postulated, 270
      - *B.* Fukuoka Paradysentery A. and B., from Infants, 257–8
      - *B. pyocyaneus*, in Service Cases from the Mediterranean Area, 64
      - Mannite Fermenting in Australians in Egypt, 261
        - Identification of, 262
      - Pseudo-Dysentery Bacilli, Strains of, 266
      - Pseudo-Dysentery group: in relation to true Dysentery Bacilli and *B. coli*, 59
      - Unfamiliar, Pathogenic, in Gallipoli-Contracted Naval Cases, 64
    - Bacteriological Control of Campaign against the Disease, 57
      - Diagnosis: Material for: How best Procured and Used, 58
    - Brilliant Green for Isolation of particular Bacteria, 65
    - Organisms Associated with, in Northern Italy, 258
    - Ultra-visible Organism Antagonistic to *B. dysenteriae* Shiga, 262
  - Carriers, 57, 58
    - Detection of: Bacteriological Methods Essential, 57
    - Search for, among Soldiers from Gallipoli and Egypt: Bacilli found, 66
  - Choleraic type: Diagnostic Difficulty, 214
    - Incidence
      - Balkan Zone, 214
      - Ceylon, 214
  - Clinical Observations, 58–9
  - Complications, 259
    - Due to Shiga-Kruse type of Bacillus, 57

Dysentery—*cont.*
- BACILLARY—*cont.*
  - Culture Media
    - Metachrome Yellow, 264
    - Three Colour, 264
  - Death in Various Stages: Immediate Causes, 268
  - Dehydration in
    - Part played by, at Onset, 271
    - Prevention, 270, 271
  - Diagnostic Methods, 264, 269
    - Bacteriological, the Best, 58
    - Laboratory, 274
    - Sero-diagnosis, 57
  - Diarrhoeal Form; Recurrences; Salonika, 270
  - Dysenteriform Diarrhoeas due to *B. dysenteriae* (Various forms), in German War Prisoners: Treatment, 269
  - and Dysentery-like Diseases; Causal Organism, 277
  - Etiology, 267
  - Forms seen in Balkan Zone, 214
  - Haemorrhagic Colitis, Epidemic: Etiology, 260
  - Incidence
    - Age (Infants), 257
      - Seamen, Troops and War Prisoners, 55, 58, 64, 256, 259, 260, 264–5, 270–1
    - Geographical
      - Balkan Zone, 214
      - British East Africa, 60
      - Eastern War Fronts, 65, 267–8
      - France: Somme Region (epidemic 1916), 35–7, *table*, 56
      - Germany (epidemic), 259, 272
      - Egypt (Cairo), 261
      - Hungary, 264
      - Italy, Northern, 258
      - Lodz (epidemic 1916), 60
      - Mesopotamia, 65
      - Portugal, 257
      - Salonika, 256
      - Switzerland (Imported Case), 258–9
    - Race, 60, 261
  - Pathogenesis, 260
  - Prophylaxis
    - Accessory to Treatment, 256
    - Inoculation, 264–5
    - Rectal, 260
  - Rectal Infection, 260
  - Recurrence, 259
  - References to Literature, v–vii, xlv–vi
  - Sequelae, 214, 259, 273
    - Achylia gastrica, 272
  - Stool Examinations, 57, 58
    - Faeces for
      - Fresh, Essential, 57

Dysentery—*cont.*
- BACILLARY—*cont.*
  - Stool Examinations—*cont.*
    - Faeces for—*cont.*
      - Temperature for, in Transit, 58
    - Methods, 264
  - Symptoms, 259, 272, 273
    - Arthritic, 256, 266, 271
    - Colitic, 267–8
    - Septicaemic, 255–6
  - Toxicity of Products of Alimentary Canal during, 271
  - Toxin
    - Antitoxin against, 261
    - Hitherto Unknown, in Kruse Mannite-fermenting Strains A-H, 261
  - Transmission by
    - Carriers, 57, 58
    - Contact, 259
    - Slight Cases, 58
  - Treatment by
    - Astringents, &c., 60
    - Atropine, 59
    - Calomel (Ineffective), 59
      - Castor Oil, and Bolus Alba, 57
    - Carpentier and De La Mothe method, 68
    - Castor Oil, 271
    - Emetine: Divergent Views, 65
    - Opium, 59
    - Polyvalent Anti-Dysenteric Serum, with Saline Injections, 65
    - Purgatives (*see also* Castor Oil, *supra*), Initial, 214
    - Rectal, 260
    - Salines, 65, 270, 271
    - Serotherapy, 256, 259, 265, 269, 270
      - Accessories, 256
    - Specific, 266
    - Tannic Acid Preparations, 57
    - Vaccine
      - Castellani's Directions for Making, 214
      - New form, 60
      - New Mode of Preparation, 59
      - New Multivalent Protective form, 59–60
      - Polemic on, 61
      - Polyvalent, of Ross and Kauntze, 60–1
      - Shiga Vaccine: Drawbacks to, 59
      - Value of, proved in Severe Cases, 60
    - Yoghurt and Animal Charcoal, 273
  - True, and Diarrhoeal, Bacilli relatively associated with: Treatment, &c., 269
  - Variability and Modification of, 266

- **Dysentery**—*cont.*
  - CILIATE, OR BALANTIDIASIS
    - Incidence: Geographical
      - Balkan-Adriatic Region, 214
      - Egypt, 44
      - Philippines, 274–5
      - Race, 274
    - Parasite in Filipino Case, Symptoms, Treatment, and Post-mortem Findings, 274–5
    - References to Literature, vii, xlviii, xlix
  - FLAGELLATE, 61–3, 274–5
    - Incidence
      - Class, 63
      - Geographical
        - Balkan-Adriatic Zone, 214
        - China (Shanghai), 66
        - Egypt, 43
        - Omdurman, 63
      - Race, 61, 63
    - Infections; Remarks on, 45
    - Lambliasis
      - Lamblia or Giardia Infection: Egypt, 43
    - Parasites associated with, and Present in
      - Amoebae, encysted, 61
      - *Cercomonas* sp., 61
      - *C. hominus*, 62
        - Balkan Region, 214
      - *C. mesnili*, Percentage in Liverpool Cases, 46
      - Enteromonas
        - *E. hominis* in European Faeces: Omdurman, 63
      - Giardia, *see* Lamblia, *infra*
      - Lamblia, 44
        - Action on, of Methylene Blue Combination as Duodenal Irrigation, 62
        - *L. intestinalis*, Action on, of Emetine, 54
          - in Balkan region, 214
          - and Cysts, in Faeces, 67
          - in Non Dysenteric Cases, 47
          - Percentage in Liverpool Cases, 46
      - Macrostoma, *see* Tetramitus, *infra*
      - Prowazekia resembling *P. asiatica*, 214
      - Tetramitus
        - *T. mesnili*
          - Balkan Region, 214
          - Egypt, 43, 44
        - *T. mesnili*, alone, and with other Parasites, in Faeces, 67
          - in Non-Dysenteric Cases, 47
      - Trichomonas sp., 62
        - *T. hominis*, 62
          - Balkans, 214
          - Egypt, 44

- **Dysentery**—*cont.*
  - FLAGELLATE—*cont.*
    - Parasites—*cont.*
      - Trichomonas—*cont.*
        - *T. intestinalis* in
          - Liverpool Cases, Percentage, 46
          - Non-Dysenteric Cases, 47
    - References to Literature, viii
    - Symptoms, 61, 63
    - Treatment by
      - Calomel, Salines and Salol, 63
      - Duodenal Irrigation with Methylene Blue, &c., in Combination, 62
      - Methylene Blue, 62, 214
        - Castellani's, 61
        - with Bismuth, Ineffective, 62
    - Trichomoniasis
      - in Egypt, 43
      - Obstinate; Treatment by Carpentier and De La Mothe Method, 68
      - Parasite
        - Trichomonas: Pathogenicity Discussed, 63
          - *T. hominis*, alone, or with other Parasites in Faeces, 67
      - Treatment by Iodine Solution, 62, 63
        - Myxodemaas Sequel, cured by Thyroid Extract, 62, 63
  - MIXED AND UNCLASSED, 64–9, 200, 265–75
    - Amoebae and Bacilli simultaneously present, 66, 269
    - Associated with
      - Paratyphoid, 269
      - Typhoid, 64
    - Bacteriology
      - Bacilli acting as Causal Agents of Paradysentery, 267
      - Bacilli found, 67
        - When No Dysentery Bacillus found, 273–4
      - Capsulated Bacillus S., 274
      - *Bacterium proteus* in, 273
      - *Streptococcus pyogenes* in, 67
    - Chronic
      - Symptoms, 69
      - Treatment by
        - Ipecacuanha, 69
        - Koorchi (bark), 218
    - Colitis
      - Etiology, 274
      - in Indian Troops: **Waziristan**, 274
      - Treatment, 274
      - Haemorrhagica; Causal Agent; Diagnosis, 267
    - Convalescence and Complications thereof, 271
    - Dehydration, 271

Dysentery—*cont.*
- MIXED AND UNCLASSED—*cont.*
  - Diarrhoea Acute, Quebec Epidemic (1917), 270
  - Dysenteric Types of, in Italian Troops, 268
  - Disease resembling; Yoghurt Treatment of, 273
  - Incidence
    - Class: 64, 65, 66, 129, 268, 269, 270, 273
    - Geographical
      - Austria, 129
      - Canada, 270
      - Eastern War Fronts, 65, 200
      - France, 268–9
      - Gallipoli, 64, 65, 66, 271
      - Germany (Cologne), 273
      - Italy, 268
      - Mediterranean Area, 64, 65, 66
      - Middle East, 65
      - Virgin Islands, 217
    - Race, 129
    - Sex, 270
  - Leucocyte Count, Abnormal, as Diagnostic of Mixed Amoebic and Bacillary Infection, 66
  - Masked Dysentery, Detection Methods, and Differentiation from Enteritis, 65
  - Paradysentery; Etiology, 267
  - Predisposing Conditions, 217
  - Protozoal Parasites in Faeces: Numerical Occurrence in 477 Cases, 67
  - Pseudo-Dysentery; Malaria Simulating: Balkan Regions, 10
  - Recurrences following Abdominal Operations, 272
  - References to Literature, vii-viii, xlvii-ix
  - Rheumatic Affection of the Joints after, with other Complications; Prognosis: Treatment, 68–9
  - Symptoms: Oedema, 273
  - Treatment by
    - Carpentier and De La Mothe Method, 68
    - Quinine and Carbolic Acid, 69
    - Silver Nitrate, 272
    - Surgical Means
      - Coecostomy, Early, advised, 272–3
      - Concomitants, 273
    - Yoghurt, 273
  - Typhoid-like in Infants: B. Guiana: Bacilli found, 67
  - Unripe Bael Fruit of Value in, 218

Echinococcosis, *see* HYDATID DISEASE, *under* **HELMINTHIASIS**

Elephantiasis, *see under* **HELMINTHIASIS**

ENTERIC FEVERS IN THE TROPICS, 432–58
- PARATYPHOID
  - Bacteriology
    - Agglutination titres after Protective Inoculations (*tables*), 450
    - *B. para*
      - Persistent Infection with; Treatment by Autogenous Vaccine, 266
      - Ultravisible Microbe Antogonistic to, 262
    - *B. para.* A.
      - Agglutination phenomena, 439
      - Carriers, at Parel, 211
      - in Gallipoli Convalescents, 66
      - in Mixed Dysentery: France, 57
      - Infection
        - Prophylaxis; Inoculation; Duration of Effect, 455
        - Spread of, in Europe by Troops, 438
        - Symptoms, 438–9
      - Observations on, 438–9
    - *B. para.* A., and A. and B., as Cause of Dysenteric Diarrhoea in Italian Troops, 268
      - Action on, of Normal Serum, 155
      - in Balkan-Adriatic Regions, 213
        - Cultures: Brilliant Green for, 444
      - in Dysentery Convalescents, 271
      - in Mixed Dysentery Cases on the Somme, 269
    - *B. para.* B., 440
      - in Carrier: Long Duration of, 439–40
      - Cases of long Duration with peculiar Features, 439–40
      - in Dysentery in War, 273
      - in Gallipoli Convalescents, 66
      - in Mixed Dysentery: France, 57
      - Organism resembling from Dysentery Stools, 262–3
      - Toxin Produced by; Pathogenic Effect, 452
      - Infection
        - Incidence
          - Class (Troops), 440
          - Geographical
            - Balkan-Adriatic, 213
            - Salonica, 440
      - Post-Mortem Findings, 440
      - on S.W. War Front, 438

Enteric Fevers in the Tropics—*cont.*
- PARATYPHOID—*cont.*
  - Bacteriology—*cont.*
    - *B. para.* B.—*cont.*
      - Thrombosis of Cerebral Arteries in, 440
    - *B. para.* B. group; *B. suipestifer* from Blood, 185
  - Complications, Symptoms, and Technique, 432
  - Incidence, *see also above*
    - Class, 438, 453–4
    - Geographical
      - Africa, North, 438
      - East, The, 438
      - Europe, 438
      - Loochoo Islands, 454, 455
      - War Fronts, 453–4
  - Jaundice due to: Balkan Region, 214
  - Mixed Infection with Bacillary Dysentery: France, 57
  - Modification of, by Prophylactic Vaccination, 266, *see also* 262, 264
  - Prophylaxis
    - Re-Vaccination, 453–4
    - Vaccination
      - Value proved, 453–4
        - Diagram, 454
  - Summary of Knowledge of, 432

- TYPHOID
  - Associated with Dysentery, 64, 66
  - Bacteriology
    - Agglutination after Protective Inoculation (with Charts), 446–7
    - *Bacillus*(i)
      - *B. typhosus*
        - Agglutinins: Evolutions of, 439
        - Antigenic Properties of Different Strains, 446
        - in Contaminated Water, Bile Powder Enrichment for Demonstrating Presence of, 454, 455
        - in Returned Dysentery Cases from Gallipoli, &c., 64, 66
        - and Typho-Uro-Reaction, 441–2
  - Bilious form, in relation to Weil's Disease, 207–8
  - Complicating Dysentery Convalescence, 271
  - Complications, Symptoms, and Technique, 432
  - Diagnosis
    - Differential, from P.U.O., and Trench Fever, 438
    - Serological, 438

Enteric Fevers in the Tropics—*cont.*
- TYPHOID—*cont.*
  - Diagnostic Methods
    - Agglutination: Value of, and Hints on, 450
    - Atropin: Experiments with, 432, *sqq.*, *tables*, 434, 436–7, *& facing* 434–5
    - Castellani's Absorption Test, for Mixed Infections, &c., 451
    - Metachrome Yellow, and Three Colour Culture Media, 264
    - Typho-Uro Reactions, 441–2
  - Fevers Resembling; Balkan-Adriatic Region, 214
  - Incidence
    - Age, 216
    - Class and Race, 129, 453, 454
    - Geographical
      - Austria, 129
      - Balkan-Adriatic Region, 213
      - Eastern War Regions, 453–4
      - Ecuador, 218
      - Indo-China (Hanoi), 458
      - Philippine Islands, 216
      - Virgin Islands, 217
  - Intestinal Perforation; Suture and Cure, 458
  - Mixed Infection with Bacillary Dysentery; France, 57
  - Prophylaxis
    - Immunisation of an Entire Population, 455
    - Inoculation, 122
      - Duration of Effect, 455
      - Dysenteric Attacks following, 247
      - Modification Effected by, in Character of the Disease, 266
      - Value of, 453, 454, Diagram, 454
        - Seen in Gallipoli cases among Naval Seamen, 68
  - Rash of: Resemblance to Rash of Typhus, 213
  - References to Literature, viii, xlix
  - Sewage Disposal in relation to, 217
  - Stool Examination Methods in Combined work on Typhoid, Paratyphoid, and Dysentery, 264
  - Symptoms and Clinical Conditions, 458
  - Treatment by Vaccines; Polyvalent Sensitized, Sediment of, 440–1
  - Typhoidin Skin Reaction Test, 452–3
  - Water-Supplies in relation to, 217

Enteric Fevers in the Tropics—*cont.*
  TYPHOID AND PARATYPHOID
    Adrenalin, Effect of, in Healthy Men, Irritable Heart, Typhoid, 434, *table*, *ib.*
    Bacteriology
      Bacillus(i)
        Abnormal, 442
        B. typhosus and *B. para.* A. & B.; Morphology, Reactions, &c., 442, *table* 443
          Agglutination Experiments 442
          Differentiation of, by Dextrin-Inosite Medium, 444
          Preservation of, in Stools by Emulsifying in Glycerine (with Charts), 444–6
    Castellani's Absorption Test: Technique and Applications, 451
    Incidence
      Age, 439
      Class (Troops), 432, 438, 439
      Geographical
        Canada (Montreal), 435
        France, 432
        Tirol, 438
      Sex, *439*
    Mixed Infections with *B. para.* A., 439
    Ocular Compression; Effects on Healthy Subjects and on Enteric Patients, 438
    Prophylaxis
      Inoculation, Triple; Intervals between, 454
    Relative Prevalence in Sea and Land Services: Mediterranean Area, 64
    Stool Examination Methods, 264
    Widal Reaction and Atropin Test: Variability in Time of Appearance of the Former, *table*, 435; other Comparisons, *table*, 436–7

Enteritis, *see under* **MISCELLANEOUS**

ENTOMOLOGICAL REFERENCES
  Amblyomma sp., Ecuador
    A. cajennense, 217
    A. maculatum, 217
  Anopheles, *q.v. under* **MALARIA**
    Nyssorhyncus annulipes
      Larvae, 237
      Natural Enemies of, 238
  Argas miniatus in Fowl Houses, in relation to *Spirochaeta gallinarum*, 418

Entomological References *cont.*
  Bed Bugs, *see* Bugs, *and Cimex*, *&c.*
  Bugs, in relation to Leprosy, 405
  Campaign against Insects in Russia, 235
  Caterpillar causing Urticaria: Rumania, 393
  Cellia albimana; Ecuador, 217
  Cimex rotundatus; Ecuador, 217
  Cordylobia rodhaini Larva, in Native's Arm, Accra, 238
  Ctenocephalus serraticeps; Ecuador, 217
  Culicidae of Northern Territory, Australia, 237–8
  Dermacentor sp.
    D. nitens: Ecuador, 217
    D. venustus, Vector of Rocky Mountain Spotted Fever, 186–8
  Disinsection: Malanin's Solution for, used in Russia, 235
  Ectoparasites of the Gondi, 425
  Epicauta sp., Bullous Eruption in Khartoum, due to
    S. sapphirina, 393
    E. tomentosa, 393
  Fleas of Ecuador, 217
  Flies: Adults, Eggs, and Larvae; Destruction of, Method for, 236–7
    Musca domestica, Herpetomonas Infection of; Accra, 238
  Fly-proofing of Tents, &c., 234
  Glossina (Tsetse-flies), *see under* **SLEEPING SICKNESS**
  Hylesia genus; Skin-affections due to, 392
  Importance of, in relation to
    Armies, 15
    Malaria, 15
  Insects Collected at Accra (1916), 238
  Leptus Akamushi, cause of Japanese River Fever (*q.v.*); Life History, 194
  Lucilia Caesar Larvae, Dermatomyiasis due to, 397
  Micuim, Brazilian Acaroid: Dermatitis due to, 393–4
  Mites, *see Leptus Akamushi*, *supra*
  Mosquitoes, *see also Anopheles*, *and Culicidae*, *supra and Stegomyia*, *infra*
    Breeding Places, 238
    House-Breeding, in relation to Filariasis (*q.v. under* **HELMINTHIASIS**), Virgin Islands, 217
    Kerosene as Larvicide: Action of, 239
    Larvae; Natural Foes, 238
  Moth, Japanese; Skin-affection due to, 392

Entomological References—*cont.*
Pediculi, *see also under* **RELAPSING FEVER,** *and* **TYPHUS**
P. humanus
Biology, Prevalence, and Modes of Dissemination, 236
Russian Methods against, 235
and *Phthirus*, Bibliography: Wide scope of, 236
Periplaneta orientalis, Triconymphid Parasites of, 423
Porocephalus larvae, Accra, 210
Pulex dugesi; Ecuador, 217
References to Literature, xxxvi-viii, lxxvii-viii
Sarcopsylla penetrans; Ecuador, 217
Pyonosoma; Trypanosomidae of: Limitations of Adaptability of, 425
Stegomyia
S. fasciata, *see also under* **YELLOW FEVER**
Distribution
Australia, Northern, 238
Ecuador, 217
Gold Coast, 238
Lankesteria culicis in Larvae, 238
Resistant Egg-Stage of, 210
Termites: Triconymphid Parasites of, 423–4
Tick-spread Diseases, *see* **ROCKY MOUNTAIN SPOTTED FEVER**
Ticks, *see* Amblyomma, *and* Dermacentor, *supra*
Distribution: Ecuador, 217
Triatoma, Infected by *Trypanosoma cruzi*, 166
Tsetse-flies, *see* Glossina, *under* **SLEEPING SICKNESS**
Xenopsylla cheopis; Ecuador, 217

Espundia, *see* **Leishmaniasis,** Muco - Cutaneous, Naso-Oral, *under* **KALA AZAR**

FEVERS IN THE TROPICS, UNCLASSED (*see also* **Dengue,** and other Fevers, *under* Names), 182–5
Bacillaemia due to *B. faecalis alkaligenes* Infection: Egypt, 183
Pathogenicity and Specific Characters of the Bacillus, 183–5, *table*, 184
B. suipestifer Isolated from Blood of Supposed Enteric Case, 185
Febris Palustris Remittens, in the East: Symptoms, Diagnosis, Treatment, 185

Fevers in the Tropics—*cont.*
Fevers due to Filterable Viruses (Cryptomorphic); Clinical Points Distinguishing, 218
Fevers in Waziristan Field Force, 183
Five-Day Fever, 200
Non-Malarial Fevers, Low and High Intermittent; Balkan-Adriatic Region, 214
References to Literature, viii-ix, xlix-l
Trench Fever
Balkan-Adriatic region, 214
Is it a Spirochaetosis ? 207
Recurrent: Mesopotamia, 182–3

Filariasis, *see under* **HELMINTHIASIS**

Five Day Fever, *see under* **FEVERS, UNCLASSED**

Framboesia, *see* **YAWS**

Frontier Sores, *see* **Leishmaniasis,** Dermal, *under* **KALA AZAR**

Guinea-Worm, *see* Dracontiasis, *under* **HELMINTHIASIS**

Haemoglobinuric Fever, *ee* **BLACKWATER FEVER**

HEAT STROKE,
Blood Conditions in, and after, 169, 172, 173
Body-temperatures, 169
Deep Breathing to Prevent, 170, 171
Etiology, 170
Experimental Acclimatization [of Monkeys] to Tropical Sun, 171–2
Fatigue-toxins as Cause of, 170
Incidence
Age, Class, Place, and Habit, 16
Post-mortem Findings, in
Man, 169, 172, 173
Rabbits, 172–3
Prophylaxis, 170, 171
Railway-Carriage Temperature, Reduction of, 171
References to Literature, iv, l
Symptoms, 169
Treatment by Hydrotherapy and Cardiac Stimulants, or External Heat and Sedatives, 170

- **HELMINTHIASIS,** 73–112
  - DISEASES, and PARASITES associated with them, *see also* PARASITES, *infra*
    - ANGUILLULOSIS, due to *Strongyloides stercoralis*; Balkan Region, 215
    - ANKYLOSTOMIASIS
      - Arrest of Development in Children due to, 88
      - Blood-Conditions
        - Arneth Count, 88–9, 229
          - When Coexistent with Malaria, 229
        - Globular Resistance, 89
      - Correlation of, with Transmissible Diseases, 84
      - Hookworm Campaigns, 86, 100 *et sqq.*
        - Economics of, 103
      - Human Excrement as Fertilizer, in relation to: China, 88
      - Immunity; Racial, 105
      - Incidence
        - Age, 88, 95, 216
        - Class
          - Convicts, 96
          - Coolies, 86
          - Farmers, 88
          - Jail-prisoners, 85
          - Miners, 88
          - Naval Seamen, 87–8
          - Troops, 84–6
        - Geographical
          - Accra, 88–9, 95, 210
          - Antigua, 100–1
          - Brazil, 87–8
          - Ceylon, 110–12
          - China, 88
            - North, 97
          - Costa Rica, 107–8
          - Grenada, 103–4
          - Guadeloupe, 96
          - Guatemala, 108–9
          - Guiana
            - British, 86, 101–2
            - Dutch, 102–3
            - French, 96
          - Guinea, French, 95
          - India, 87
          - Martinique, 96
          - Nicaragua, 109
          - Panama, 100
          - Philippines, 85, 96, 97, 216
          - Porto Rico, 387
          - St. Gothard Tunnel (epidemic), 86
          - St. Lucia, 104–5
          - St. Vincent, 105–6
          - Salvador, 109–10
          - Senegal, 95
          - Trinidad, 86, 106–7

- **Helminthiasis**—*cont.*
  - DISEASES, and PARASITES associated with them—*cont.*
    - ANKYLOSTOMIASIS—*cont.*
      - Incidence—*cont.*
        - Geographical—*cont.*
          - U.S.A., Southern States, 84–5
          - Virgin Islands, 217
        - Race, 105
        - Urban and Rural, 84
      - Military Aspects, 84–6
      - Morbidity-Rates as affected by, 84, 85
      - Parasites
        - Ancylostoma
          - Ova, in
            - Faeces: Accra, 95
            - Niger Water, 95
          - *A. braziliense*, Differentiation of, from *A. ceylanicum*, 87
          - *A. clylanicum*, 87
          - *A. duodenale* in Cats [?] and Man: French Guiana, 96
            - in Boys: Serbia, 213
            - in Faeces, 67
            - Ova: Ecuador, 217
            - Percentage: N. China, 97
        - *Necator americanus*, 89
          - Accra; in Fatal Cases, 210
          - French Guiana, 96
          - Porto Rico, 387
          - Larvae; Circuit of, in Guinea-pig, 82
          - Ova: Ecuador, 217
      - Prophylaxis, *see also* Hookworm Campaigns, *supra*
        - Military; French Guiana, 96
        - Quarantine Regulations; St. Lucia, 104
      - References to Literature, xi, lii-iii
      - Risk of Spread to Europe by American Troops, 85–6
      - Sanitary Improvements in connection with Hookworm Campaigns, 101 *et sqq.*
      - Symptoms, 88
      - Treatment by Various Methods
        - Chenopodium in Various forms, 86–7, 98, 99
        - Chloroform, 98, 99
        - Intensive, of Immigrants from India to Trinidad, 107
        - Quassia, 87
        - Thymol, 85, 98, 99
          - With Lactose and Sod. bicarb., 86
    - ASCARIASIS
      - Canine; treatment by Ol. Chenopod. and Chloroform, 98, 99

Helminthiasis—*cont.*
- DISEASES, and PARASITES associated with them—*cont.*
  - ASCARIASIS—*cont.*
    - Incidence
      - Age, 83, 95, 216
      - Geographical
        - China, Northern, 97
        - Galicia, 97
        - Germany, 83
        - Guiana, French, 95
        - Guinea, French, 96
        - Italy, 83
        - Philippines, 96, 97, 216
        - Senegal, 95
      - in Man, Pig, Rat, and Mouse, 81–2
      - Race (Balkan Regions), 97
    - Infection, Direct, and *viâ* Intermediate Hosts, discussed, 81–2
    - Intestinal Obstruction due to, 83, 84
    - Parasites
      - Ascaris
        - Larvae: Passage of, to Lungs, in Pigs and Man, 81–2
        - Passage of, through Intestinal Perforation in Typhoid, 458
        - Rodents as Intermediate Hosts, 82
      - *A. lumbricoides*
        - Abdominal Symptoms due to, 83
        - in relation to Cholera: Philippines, 216
        - Infection in Filipino Children, 215, 216
        - Intestinal Obstruction due to, 84
        - Life-cycle; Experiments on, 82
        - Ova, in Faeces, 67
          - Where found and Percentage of, 95, 97
        - in Right Pleural Cavity, 83
      - *A. suum*, Extra-corporeal Vitality, 82
    - References to Literature, xi, liii
    - Symptoms, 83
    - Treatment by
      - Calomel and Santonin, 83
      - Fasting and Purgation, 82, 83, 84
        - Objects of, 82
      - Ol. Chenopod., 99
        - With Castor Oil, 83
      - Surgery, 83
  - BILHARZIASIS, *see* SCHISTOSOMIASIS, *infra*

Helminthiasis—*cont.*
- DISEASES, and PARASITES associated with them—*cont.*
  - CESTODE INFECTIONS, *see* TAENIASIS, *infra*, and others, *under* Names
    - References to Literature, xi, li
  - CLONORCHIASIS
    - Complications, 74
    - Due to Eating Certain Fish, 73
    - Incidence
      - Geographical
        - China, 74
        - Cuba, 74
        - Japan, 73
      - Race, 74
    - Parasite
      - Clonorchis
        - *C. endemicus*
          - Probably Identical with *C. sinensis* in Japan, 73
        - *C. sinensis*
          - Life-History and Morphology, 73
          - Ova in Stools: Cuba, 74
          - Primary Intermediate Host, 76
    - References to Literature, ix-x
    - Symptoms, 74
  - DISTOMIASIS, Pulmonary, *see* PARAGONIMIASIS, *infra*
  - DRACONTIASIS or Guinea-Worm
    - References to Literature, xii, liii
    - Treatment by Iod. tinct., 93
  - ECHINOCOCCOSIS, *see* HYDATID DISEASE, *infra*
  - ELEPHANTIASIS
    - Co-incident with Onchocerciasis, 92–3
    - Incidence: Geographical
      - Congo, Belgian, 92–3
    - References to Literature, xii
  - FILARIASIS
    - Filarial Diseases Treated by Vaccines
      - Lymphangitis, 91, 92
      - Orchitis, 92
      - Septicaemia, 92
      - Synovitis, 92
    - Incidence
      - Geographical
        - Australia
          - North Queensland, 90–1
        - Guiana, British, 91–2
        - Porto Rico, 387
        - Virgin Islands; Percentage of, 217
      - Race, 90, 91
    - Lymphadenitis due to *F. bancrofti*, 215

- **Helminthiasis**—*cont.*
  - DISEASES, and PARASITES associated with them—*cont.*
    - FILARIASIS—*cont.*
      - Parasites
        - Filaria and Microfilaria
          - *bancrofti*
            - Larval, Periodicity, 90
            - Lymphangitis Associated with, 91–2
            - in Night Blood; Accra, 95
          - *conjunctivae*, 92
          - *loa*, 92, 95
          - *loa extraocularis*, n. sp., Caucasus; Differential Characteristics, 92
          - *nocturna*; Periodicity, 90
          - *perstans*, in Night Blood: Accra, 95
          - *volvulus*, Infection by, not to be Confused with that from *bancrofti*, 93
      - References to Literature, xii, liii
      - Symptoms, 90, 91
      - Treatment by Vaccine, 92
    - GUINEA-WORM, *see* DRACONTIASIS, *supra*
    - HOOKWORM INFECTION, *see* ANKYLOSTOMIASIS, *supra*
    - HYDATID DISEASE: India, 94–5
    - HYMENOLEPIS Infection
      - Parasite
        - *H. nana*,
          - Balkans, 97
          - Ecuador, 217
    - NEMATODE INFECTIONS, *see* Diseases due to, *under* Names
      - References to Literature, xi–xii, li–iii
    - ONCHOCERCIASIS
      - Co-incident with Elephantiasis, 92–3
      - Incidence
        - Congo, Belgian, 92–3
      - Parasite
        - Onchocerca
          - *O. volvulus*, in relation to Elephantiasis, 92–3
    - OXYURIASIS
      - Incidence
        - Age, 216
        - Class, 96
        - Geographical
          - Accra, 95
          - China, North, 97
          - French Guiana, 96
          - Galicia, 97
          - Philippines, 216

- **Helminthiasis**—*cont.*
  - DISEASES, and PARASITES associated with them—*cont.*
    - OXYURIASIS—*cont.*
      - Parasite
        - Oxyuris
          - in Appendices, 98
          - Ova in Faeces: Accra, 95
          - *O. vermicularis*
            - Ova, in Balkan Faeces, 97
            - Percentage in
              - Cholera Carriers and Convalescents, 113
              - North China, 97
    - PARAGONIMIASIS (Distomiasis)
      - Causation, 75
      - Incidence
        - Age, 74
        - Class, 75–6
        - Geographical
          - Formosa, Northern, 74–5
          - France (non-indigenous), 75–6
        - Race, 74, 75–6
      - Misdiagnosed as Chronic Bronchitis, 76
      - Parasite
        - *Paragonimus westermanii*
          - Cercariae, Free and Encysted, 74–5
          - Life-cycle, 74–5
          - Mollusc and other Hosts, 74–5, 76
          - Ova in French Cases in Orientals, 76
      - References to Literature, x, li
      - Summary on Distribution and Clinical Signs, 76
      - Symptoms, 75–6
      - Treatment by Emetine, 75
    - PSEUDOAPPENDICITIS ZOOPARASITARIA, Characteristic Signs, 98
    - SCHISTOSOMIASIS (Bilharziasis)
      - Blood-Conditions, 78
      - Incidence
        - Geographical
          - Brazil, 78, 79
          - China, 88
          - Cochin-China (presumed), 77
          - Egypt, 76–7, 81
          - France (Imported Cases), 77
          - Guiana, French, 96
          - South Africa, 81
          - Transvaal, Northern, 77
          - Venezuela, 79
          - West Africa, 77
        - Race, 76, 77
      - Modes of Infection discussed, 78

- **Helminthiasis**—*cont.*
  - DISEASES, and PARASITES, associated with them—*cont.*
    - SCHISTOSOMIASIS—*cont.*
      - Parasites
        - Schistosoma
          - Cercariae: Infection Experiments, 80
          - Intermediate Hosts, 78–9, 80–1
          - Miracidia; Integument of, 99
          - Ova; Location; and Symptoms according thereto, 76–7
          - Pools and Rivers Infested by, 77, 79, 81
        - *S. haematobium*
          - Ova and Miracidia; Viability of, 79–80
          - Recurrent Attacks due to, 77–8
          - Routes of Penetration, 78
        - *S. japonicum*; Cercariae, Points on Heads of, 78
        - *S. mansoni*
          - Cercariae; Development of, 78–9
          - Intermediate Host, 78, 79
          - Infestation of, in French Guiana, 96
      - Prophylaxis, 79, 81
      - References to Literature, x-xi, li
    - RECTAL; in Egypt, in Australian Troops, 76–7
    - STRONGYLOIDOSIS
      - Incidence
        - Age, 96
        - Geographical
          - Balkan-Adriatic Region, 215
          - China, North, 97
          - Guinea, French, 96
          - Philippine Islands, 96
      - Parasite
        - Strongyloides
          - Elimination from U.S. Troops; Importance of, 85–6
          - *S. stercoralis*, 215
            - Ova in Faeces: Accra, 95
            - Percentage: N. China, 97
      - References to Literature, liii
      - Treatment by Thymol and Calomel, 96
    - TAENIASIS
      - Incidence
        - Geographical
          - Philippine Islands, 96–7
          - U.S.A., 94
        - Race, 94

- **Helminthiasis**—*cont.*
  - DISEASES, and PARASITES associated with them—*cont.*
    - TAENIASIS—*cont.*
      - Parasites
        - Bothriocephalus, *see also* Dibothriocephalus, *infra*
          - *B. liguloides* (*Ligula mansoni*) in Animals: Development, 94
        - Dibothriocephalus
          - Species probably Harboured by Dogs, 94
          - *D. latus*
            - Experiments on Development, 93
            - Ova: Difference of, from Ova of *Ligula mansoni*, 94
            - Typical Case of Infection, 94
        - Taenia, 96
          - in Faeces, 67
          - Frequent: Balkan-Adriatic Region, 216
          - *T. saginata*; Ova in Faeces, Accra, 95
          - *T. solium*, in Balkan Faeces, 97
            - in Ecuador, 217
      - References to Literature, ix-xi,
      - Treatment; All Forms, by
        - Male Fern Extract, 94
        - Ol. Chenopod., 99
    - TREMATODE INFECTIONS, Known Hosts transmitting to Man, 80–1, *see also* Diseases due to, *under* Names
      - References to Literature, ix, xi, li
    - TRICHOCEPHALIASIS or TRICHURIASIS
      - Incidence
        - Age, 89, 95
        - Class (Marines), 89–90
        - Geographical
          - Brazil, 89
          - China, North, 97
          - Galicia, 97
          - Guadeloupe, 96
          - Guiana, French, 96
          - Guinea, French, 95
          - Philippine Islands, 96
          - Senegal, 95
        - Race, 96
      - Intestinal, Fatal, in Child, 89
      - Parasites
        - Trichuris, 89
          - in Appendices, 98
          - Ova in
            - Faeces, 67
            - Niger Water, 95
          - *T. trichiura*, in relation to Appendicitis, 89–90

Helminthiasis—*cont.*
DISEASES, and PARASITES associated with them—*cont.*
TRICHOCEPHALIASIS—*cont.*
Parasites—*cont.*
Trichuris—*cont.*
T. trichiura *cont.*
Ova in Faeces
Accra, 95
Balkans, 97
Percentage in
Cholera Carriers, 113
North China, 97
References to Literature, xii, liii

VESICAL or URINARY
Incidence
Egypt, 79
France (Imported Cases), 77
Transvaal, 77–8
Parasite
Early Stages of, 79–80

GENERAL AND UNCLASSED, and Miscellaneous References
Appendicitis in relation to Worm Infection, 90
Carriers, Percentages: French Guiana, 96
Chenopodium: Administration Notes, 99
and Chloroform as Anthelmintics, 98–9
Microscopical Examination of Faeces, as Elucidating Obscure Conditions, 97
Preservation of Ova in Faeces; Simple Method, 99
References to Literature, ix-xiii, li-iv
Summary of Knowledge on, 76–7
Treatment by
Emetine, 77, 81
Neo-Salvarsan, 77
Worm Canals, True and other, in the Appendix, 98

PARASITES
Distome Cercariae in Natal Snails, 80–1
Cercarial Infections of South African Snails, 80–1
in
Cholera and Carriers, 113, 216
Filipino Children, 215, 216
Natives and Europeans at Bamako, 95
Ligula
Possible Cause of Creeping Disease, 397
Metagonimus
M. yokogawai, in Korea, 76
Cercariae: Larval and Encysted, 76
Ova, 76
First Intermediate Host, 76

Helminthiasis—*cont*
PARASITES—*cont*
Ova
Fixed Preparations of, Mode of Making, 112
Found in Faeces, Enumerated, 67

Hookworm Infections, *see* ANKYLOSTOMIASIS, *under* **HELMINTHIASIS**

Hydatid Disease, *see under* **HELMINTHIASIS**

Hydrophobia, Malaria giving rise to Symptoms Resembling: Ceylon, 10

Japanese River Fever, 194
Reference to Literature, xxx, lxxi
Transmission by Akamushi Mite, 194
Virus, considered to be Piroplasm, 194

Jaundice
Camp, of Spirochaetal Origin; Balkan-Adriatic Regions, 214
References to Literature, lxxv
Haemorrhagic; Malaria resembling; Balkan regions, 10
Infective Epidemic (Weil's Disease), *see* SPIROCHAETOSIS, ICTEROHAEMORRHAGICA, *under* **RELAPSING FEVER**
Splenomegalic; Balkan-Adriatic Region, 214

KALA AZAR (Leishmaniasis, All Forms), 143–57
Bed-bugs as possible Vectors 143, 144
Blood Conditions, 146–9, 151
Blood Reactions in, 152
Cimex rotundatus
Experiments with, on Transmission of Bacteria and Cocci, 143
Viability in passage through, of, Leishmania, 143
Complications, in relation to Antimony Tartrate, 151
Diagnostic Methods
Historical Account of, 144
Intensive Culture for: Technique, 144
Spleen-puncture, 150
Rules for, 151–2
Dogs as Spreaders, 153
First Indigenous Case in Cirenaica, 145
Incidence: All Forms
Age, 145–52, 214

Kala Azar—*cont.*
- Incidence—*cont.*
  - Geographical
    - Anglo-Egyptian Sudan, 153–4
    - Brazil, 156, 157
    - Europe, 145, 153
    - India
      - Calcutta, 145–51
        - Tables, 146–9
      - North-West Frontier, 154
    - Italy, 153
    - Macedonia, 214
    - Malta, 153
    - North Africa (chiefly Imported), 145
    - Sicily, 153
    - Spain (Endemic), 245–6
    - Tunis, 153
  - Race, 145, 153
- Insect Vectors, Actual and Suspect, 143, 144, 156
- Leishmania in
  - Cultivable from Blood in Apyrexial Periods, 144
  - Effect on, of Bacteria, 143
  - in Faeces of *Cimex rotundatus*, 143
  - *L. donovani*
    - Effect on, of Bacteria, 143
    - in Rectum of Bugs, 143
  - *L. donovani* and *L. tropica*
    - Experiments with, in Bed-Bugs, 143–4
      - Sub cultures, with Monkey Blood, 144
  - *L. tropica*
    - Inoculation Experiments with, 155
    - Viability in Bug Faeces, 143
- **Leishmaniases**: Various Forms
  - DERMAL or CUTANEOUS (Tropical Sore, Oriental Sore), 156
    - Experimental in Monkeys, 155
      - Secondary Infection by Auto-Inoculation, 155
    - *Leptomonas* of; Forms Identical with, from Geckos: Spain, 238
    - Treatment by Tartar Emetic, 153–4, 156
  - INFANTILE, *see* MEDITERRANEAN, *infra*
  - INTERNAL
    - First Indigenous Libyan Case, 145
  - MEDITERRANEAN
    - Histology, 145
    - Incidence; Age and Place, 145, 153
    - Treatment by Tartar Emetic, 153

Kala Azar—*cont.*
- LEISHMANIASES—*cont.*
  - MUCO-CUTANEOUS, Naso-Oral, or Espundia
    - Pseudo-Leishmaniasis Mistaken for 156
    - Incidence
      - Age, Place, Class, Sex. &c., 153–4, 156
    - Symptoms: Cure, 156
    - Treatment by Tartar Emetic, 146, 151, 153, 156
- Pium Flies as Vectors, in the Amazon Basin, 156
- References to Literature, xiii-xiv, liv-v
- Spleen-Enlargement, 146–9
  - With no Leishmania or Plasmodia present, 153
- Treatment: All Forms, by
  - Antimonial Preparations, 152
  - Digitalis, 151
  - Tartar Emetic, 146, 151–2, 153, 154, 155, 156
    - Especially in Young Children, 145–51, *tables* 146–9

Kedani Fever, *see* **Japanese River Fever**

Laboratory Reports, *see* **Reports**

Leishmania, *see under* **KALA AZAR**

Leishmaniasis, *see* **KALA AZAR**

LEPROSY, 401–10
- ANAESTHETIC
  - Contracted (?) on the Gold Coast, 406
  - in Nigeria, 409
  - Wassermann Reaction in, 404
  - Non-Infectiousness of, 403
- Bacteriology
  - Bacillus
    - *B. leprae*
      - Absence of, Indication of Absence of Danger to the Public, 403
      - Action on, of Chaulmoogra Oil, 409
      - Discovery of, 409–10
      - in Flies fed on Sores of, 405
      - in Nasal Smears, 404
- Bugs in relation to, 405
- Culion Leper Colony, Philippines: Statistics of, 401–2
- Cures: Time taken by, 406, 407, 408
- Diagnosis, from Public Health Standpoint, 403
  - Radiographical, Early, 404

Leprosy—*cont*
- Diagnostic Difficulties, 403
  - Serum Reactions, 409
- Duration of Disease, 402
- Etiological Problems, 404
- Fat Globules in Leprous Cells, 405
- Flies in relation to, 405
- Granules found in Lepra bacilli from Nasal Mucous Membrane, 404
- Hansen, and the Discovery of *B. leprae*, 410
- Incidence
  - Age, 401
  - Familial, 402
  - Geographical, *see also under* each form
    - Agua de Dios, 406
    - Brazil, 401
    - Ceylon, 408
    - Cuba (Havana), 407
    - Dutch East Indies, 405
    - Fiji, 405
    - French Guiana, 401
    - Hawaii, 401
    - India (Madras), 404
    - Malaya, 405
    - Martinique, 408-9
    - Norway, 401, 409-10
    - Philippines, 401-2
    - Porto Rico (decreasing), 387
    - Singapore, 405
    - Spain, 404-5
  - Race, 401
  - Sex, 402

- MACULAR: Curability of, 406

- MACULO-ANAESTHETIC: Transmissibility of, 402-3

- Molokai Leper Settlement, account of, 402
- Mortality among Children of Lepers, 402
- Neisser, and the Discovery of *B. leprae*, 409-10

- NERVE, *see* ANAESTHETIC, *supra*

- NODULAR (Tuberous)
  - Incidence
    - Geographical
      - Argentina, 409
      - Nigeria, 409
      - U.S.A. (in Russian Immigrant), 406

- Prophylaxis
  - Leproseries, 401
  - Segregation, 387
- References to Literature, xiv-xv, lv-vi
- Serological Experiments, 409
- Syphilis combined with, 406, 409

Leprosy—*cont.*
- Syringomyelia and Leprous Neuritis; Difficulty of Differential Diagnosis, 405
- Tissue changes in, Resembling Tuberculosis, 406
- Transmission, Problem of, and Theories on, 401, 402-3, 404, 405
- Treatment: All Forms
  - Chaulmoogra Oil, 405, 406, 407, 408-9
    - with Sod. gynocardate, 407-8
  - Cuban Methods, 407
  - Heiser's Method, 409
  - Home, 401
  - Red Mango Decoction, 407
  - Sarsaparilla, &c., as Beverage, 407
  - Sod. gynocardate, 408
    - with Chaulmoogra Oil, 407
- Unsolved Problems regarding, 404
- Wassermann Reaction in, 403, 404-5, 406

Library of the Tropical Diseases Bureau
- Journals Contained in
  - Current, i-vii
  - Out of Publication, viii

Liver Abscess, *see under* **AMOEBIASIS**

MALARIA, 1-39, 280-311.
- ACUTE
  - Cachexia of: Cause, 284
  - Special Wards for, 290

- AESTIVO-AUTUMNAL *see* SUB-TERTIAN, *infra*

- Albumenuria Increased by Intravenous Injection of Quinine, 24
- Amnesia of, 294
- Amoebiasis as Complication, 284
- Anaemia of, *see also under* Symptoms, *under* Various Forms
  - Phases of, Terminology of, and Treatment, 16
- Anaesthetics in relation to, 290
- Anopheles Associated with
  - Bionomics, 12
  - Breeding Places, 6-7, 11, 280, 304-5, 311
    - Running Water, 307
  - British: Infection of, by Returned or Imported Cases, 13
  - Carriers of, 237
  - Crescent passing Unchanged in Dejecta of, 32
  - Cold as affecting, 12, 13, 32

Malaria—*cont.*
- Anopheles Associated with—*cont.*
  - Development in, of Subtertian Parasite; Effect on, of Low Temperature, 32
  - Distribution
    - Albania, 11
    - America, U.S.
      - Arkansas, 304–5
      - North, 32
      - South, 37
    - Australia, 237–8
    - England, 13, 37, 289–90
    - France, 32–3, 37, 39
    - German East, and North-East Fronts, 11, 12, 13
    - Gold Coast, 308
    - India (Punjab), 280
    - Italy, 281, 282
    - Java, 37–8
    - Macedonia, 306, 307
    - Malaya, 307
    - Morocco, 7
    - Philippines, 291
    - Rumania, 287
    - Russia, 12
    - Switzerland, 311
  - Examination of, after Feeding on Crescent Containing Blood, 3
  - Flight-distances of, 37
  - Found in Stables, 307
  - Haunts of Predilection, 12, 307
  - Hibernation of, as
    - Adults, 37
    - Larvae, 37
    - Infectivity as affected by, 32
  - Infectibility of *A. rossi* considered, 280
  - Infection
    - Hereditary, postulated, 12
    - by Military Malaria Carriers: Prophylactic Suggestions, 30–1
  - Infectivity of, Dependent on Number of Bites taken from HumanCarrier,32
  - List of those referred to
    - *annulipes*, 237–8
    - *barbirostris*, 37
    - *bifurcatus*, 37, 282, 307, 311
    - *crucians*, 32
    - *maculatus*, 307
    - *maculipennis*, 7, 13, 32–3, 37, 282, 287, 289, 306, 307, 311
      - Proved Efficient host of *P. vivax* in England, 289–90
    - *pseudopictus*, 287
    - *punctipennis*, 32
      - Haunts, and Flight-distance Powers, 37
    - *quadrimaculatus*, 32, 304, 305
      - Haunts and Flight Powers, 37
    - *rossi*, 280, 291

Malaria—*cont.*
- Anopheles Associated with—*cont.*
  - List of those referred to—*cont.*
    - *rossi* (var *indefinitus*) 37
    - *rossii* (Giles) 37
    - *rossii* (myzomyia), 38
    - *sinensis*, 37
    - *superpictus* Gr, 307
      - var. *macedoniensis*, 307
  - of Non-Marshy regions, Infectivity of; Experiments on, 32–3
  - of North America, Plasmodia borne by, 32
  - Swarming, in relation to Relapses, 13
  - Twelve Species on Gold Coast, 308
- Anopheles Stations: French Savoy, 310
- Anopheles Survey: Trinidad, 6–7
- Anti-malarial Campaign work, &c., *see under* Prophylaxis, *infra*

- ASTHENIC; Treatment by Adrenalin, 290, 292

- Barcoo Rot in relation to, 388
- Blackwater Fever in relation to, 40, 41, 42, 287
- Blood-Conditions
  - Arneth Count (Index), 80, 89, 229, 230, 239, 292, 293, 309
  - Arterial Tension, Diminished, and Variable, 15
  - During and Between Paroxysms, 291–2
  - Embolism, in Sub-tertian, 4
  - Erythrocytes Present During and after Paroxysms, Number of, 292
  - Globular Resistance during, 302, 303
  - Leucocyte Count, 281, 291, 309
  - Leucocytes: Melaniferous, in relation to Determination of Endemic Index, 281
  - New Blood-Symptom, 309
  - Quinine Concentration Estimation 299, 300
- Blood-Examination of Returned Soldiers from Malarial Regions, 287
- Blood-Smears for Diagnosis; Thick and Thin, 36
- Bone Marrow as Site of Undamaged Plasmodia, 283, 285
- Brauer's Injection, for Bringing out Latent Malaria, 39
- Bronchitis, Dry, Malarial; Balkans, 10

Malaria—*cont.*

- Carriers, *see* Anopheles, Mosquitoes, &c.
  - Human, 14
    - Age at which Percentage highest: California, 7
    - Infectivity of Mosquitoes Dependent on Numbers of Bites taken from, 32
    - Native; Quininisation of: Algeria, 8
    - Prophylactic Treatment, 305
    - Returned Troops, *see* Incidence, Class, Troops, *infra*
    - Surgery in relation to, 290
- Cases in which Plasmodia are not Demonstrated, Showing Globular Resistance, 303
- in Children: Determination of Endemic Index, 280–1
- Cinchona Alkaloids, Lethality of, 24
- Cinchonidine the least Lethal of Cinchona Alkaloids, 24
  - Sulphate; Idiosyncracy to, 24

- CHRONIC
  - Cold, Sudden, an Exciting Cause of Relapses, 284, 285
  - Gametocyte Persistence in, 3
  - Complications; Suprarenal, 292
  - Dormant; Awakened by Surgery, 290
  - Globular Resistance in, 302, 303
  - Mononucleosis in, 39
  - Race Incidence, 40
  - Reinfections in, 284
  - Relapses in; Periodicity; Causation, 13, 284
  - Special Wards for, 290
  - Splenomegaly of, 56
  - Symptoms, 16, 19, 50
  - Treatment by
    - Arsenic and Iron with Quinine, 19
    - Quinine with
      - Arsenicals, 25, 287
      - Neosalvarsan, 25
    - Tartar Emetic, 301

- Coincident with
  - Ankylostomiasis; Arneth Count in, 239
  - Relapsing Fever (possibly), 200
- Cold, Sudden, as Exciting Cause of Relapses, 12, 13, 32, 231, 284, 285
- Compendia of Facts on, 38
- Complications, 9, 10, 14, 167, 286, 292, 293–4, 296
- Control Experiments, 304–5
- Convalescents; Agricultural Colonies for, in Anopheles-free Districts, Suggested, 30–1

Malaria—*cont.*

- Cutaneous Affection due to: Balkans, 10
- Danger of, to and from Armies, 5–6, 13, 14, 15
- Diagnosis, 310
  - Blood Smears for, Thick and Thin: Comparative Study of, 36
  - Modern Methods, 3–4
  - Differential, from
    - Acute Mania, 295
    - Cerebro-Spinal Meningitis, 295
- Diseases Simulated by, 9–10, 17, 281, 290, 295, 300
  - of the Reproductive System due to: Balkans, 10
- Double Infections; Treatment by Quinine Bihydrochloride, Intravenously, 27
- Endarteritis due to, 295
- Endemic Index, in Children; Methods of Determining, 280–1
  - in French Guiana, 7
  - of School Children; California, 7
- *Entamoeba histolytica* Infection present in, 47
- Erythrocytes, Parasitised; Alteration in; Methods for Studying, 38
- Ether as Anaesthetic for Malaria Carriers, 290
- an Exanthema; with Erythema, 17
- Febrile crises; Globular Resistance during, 302, 303
- Fever due to, Occurring after Admission for Other Complaints, 286
- Gangrene due to, 16, 296
- Gonorrhoea, Complicated by, 286
- Haematuria due to, Arsenico-Quinine Oral Treatment for, 24
- Haemorrhage in
  - Retinal, 293
  - Secondary, 294
- Health of Cases Treated as In- and Out-patients, 19
- Immunity
  - Acquired, 284, 287
  - Negro, 35
  - Researches on, 4–5
- Incidence, All forms
  - Age, 16, 216
  - Class
    - Fighting Forces, 5–6, 8, 11–13, 14–15, 17, 18, 21, 24, 25, 38, 183, 235, 280, 281, 282, 283, 284, 286, 287, 288, 294, 306, 308, 310
  - Geographical
    - Accra, 88–9, 210
    - Africa, Central, with Relapsing Fever, 198

Malaria—*cont.*
Incidence—*cont.*
Geographical—*cont.*
Albania, 11, 26, 310
Indigenous, 296
Algeria, 288
Epidemics, 8
America U S.
Arkansas, 304–5
California: Endemic, 7
North Carolina, 36
S. E. States, 305–6
Balkan-Adriatic, Mediterranean, Eastern Fronts, 9, 10, 13, 29, 198, 212, 215
with Relapsing Fever, 190
Bosnia-Herzegovina (Sarajevo), 284–5
Brazil (Madeira River), 35
British East Africa, 38
Ceylon, 9, 10
China, 88
Taiping, 297
East Africa, 297
Rufigi Basin, 306
Ecuador, 218
England
Acquired Abroad, 2. 13, 14, 19
Acquired in England, 13, 14
Sheerness, 289–90
France
Acquired at Home, 14, 16, 32–3, 289
Acquired on Service or Abroad, 18, 288
Anticipated Recrudescence, 38, 39
Latent or Potential Areas in, 39
French Guiana, 7
German Eastern and North-Eastern Front, 11 *et sqq.*
Germany, Contracted Elsewhere, 286–7, 301
Prussia, East, 283
Haussa district, 35
India, 24
Punjab, 5, 280
Italy, 14–15, 281, 282–3, 287
Brindisi district, 308
Libya (rare), 145
Macedonia, 8, 11, 14, 15, 18, 20, 26, 27, 29, 31, 284, 287, 288, 289, 290, 295, 306, 307
Madagascar, 280
Malaya, 307
Perak, 297
Manzal, 183
Morocco, 38, 288
Western, 7
Muscat, 6
Philippines, 216, 291
Poland, 286
Portugal, 310

Malaria—*cont.*
Incidence—*cont.*
Geographical—*cont.*
Portuguese India (Goa), 36
Rhodesia, 20
Rumania, 287
Russia, 300
North-Western, 12–13
Russo-German War-Front, 235
Slavonia. 25
Switzerland (possible), 311
Trinidad, 6–7
Turkey, 21
Virgin Islands, 217
West Africa, 220
Wolhynia, 286
Increase due to Presence of War Forces, 308
Race, 17–18, 24, 35, 40, 284, 302
Season, 281, 285, 287, 288
Sex, 293
Temperature and Humidity as affecting, 8, 12–13
Influence of Locality in Resistance of Patient, 288
Jaundice due to; Balkan Region, 214
Labour Corps, suggested, for Malaria Convalescents; Italian Army, 14–15
LATENT
Activation of, by
Brauer's Method, 39
Cold, *see* Cold, *supra*
Surgery, 290
Ultra Violet Light, 34–5, 285

LETHARGIC; in ex-Macedonian Patient, 18

Leukaemia after, in Natives: West Africa, 220
Liver Percussion in; Detection by, of Impending Relapse, 293

MACEDONIAN
Gravity of, to what ascribed, 288
Parasitology of, 11
Treatment of, and of Relapses, 20

Malaria Survey in Albania, 11
Malarial Fevers; Balkan Regions, 212, 213
Flea-bite Rash associated with; Errors caused by, 213
Jaundice, Transition of, to Blackwater Fever, 40
Mastitis, in, and after, 15–16
P. vivax present, 16
Pigment; Solubility of, 303–4
Pleurisy: Balkans, 10
Syndromes of Central Nervous System: Balkan Regions, 9
Mastoiditis, Simulated by, 17

Malaria—*cont.*
- Medical Entomology in relation to, 15
- Microscopical Investigations, Post-mortem, in Macedonian Military Cases, 31
- Middle Ear Suppuration Complicated by, 286
- Military Considerations concerning, *see also* Incidence, Class, *supra*, 6–7, 13, 14, 15
- Mixed Infections, 2, 7, 284–5, 287, 288
  - Effect in, of Luargol, 30
  - Treatment by Tartar Emetic; Results, 2, 30.
- Mosquito Exclusion from Tents, 234
- Mosquitoes, Essay on, in relation to the Disease, 39
  - Hibernation of, Innocuousness, possible, during, 32
  - Measures against, *see under* Prophylaxis, *infra*
  - Natural History, and relation to the Disease, 38, 39
  - of Trinidad: List of, 6
- Negro Immunity, 35

- OBSTINATE, Specific for, 309

- Parasites, *see* Plasmodia, *infra*
- Parasitology of Macedonian form, 11
- Parotitis in, 293–4
- Pathogeny and Pathology, 283
- Percentage of Replies to Circulars on Prevention (U.S.A.) 306

- PERNICIOUS, *see* SUB-TERTIAN, *infra*

- Personal Observations, by Dr. Schilling, 301
- Plasmodia
  - Action on, of
    - Novoarsenobenzol, 290
    - Quinine Bihydrochloride Intravenously, 27
    - Tartar Emetic, 28–29
  - Alternating Prevalence of Forms, 284, 287, 290
  - Anopheles Hosts of: North America, 32
  - in Blood: Disappearance of, 33-4
    - in Erythrocytes; Changes due to; Modes of Studying, 38
      - Percentages in Hausas, 35
      - Speedy Methods for Detection, 36
  - in Bone-Marrow, 283, 285
  - Crescents of, considered as Cysts, 4, 5
    - Final Developmental Phases, 3
    - Passing Unchanged with Mosquito Dejecta, 32

Malaria—*cont.*
- Plasmodia—*cont.*
  - Different forms, 35
  - Enumeration-Methods, 39
  - Gametogony, Precocious, in Moroccan Cases, 7
  - German Observations on, 291
  - in Mixed Infections; Action on, of Tartar Emetic, 301-2
  - in Mosquitoes, Effects on Development of, of Low Temperatures, &c., 32
  - Non-Sexual, Reduced by Quinine, 19
  - Parthenogenesis of, in relation to Relapses, discussed, 2-3
  - Present in
    - Blackwater Fever, 41, 42
    - Clonorchiasis case: Cuba, 74
  - Quinine Fastness, 4
    - Apparent, 21 *et sqq.*
    - Determination of, 286
    - in relation to Relapses, 12
  - Sexual Phases of, in relation to Relapses, 20
  - Schizogony of, 4, 5
  - Staining Methods, 37, 303
  - Substances with Subversive Effect on, 34
  - Undamaged by Spleen action; Site of, 283
- *P. caucasicum*, 35
- *P. falciparum*, 210, 288, 306
  - Action on, of
    - Galyl, 2
    - Luargol, 30
    - Quin. bihydrochloride, Intravenously, 1
    - Quinine Acid Hydrobromide, 297
    - Salvarsan, 222
    - Tartar Emetic, 301
  - in Ankylostomiasis Cases: Accra, 88–9
  - Anopheles Hosts, 32
  - in Blood during Epidemic, 11, 284
  - Coexistent with *P. vivax*, 284
  - Disappearance from Blood on return to France, 288
  - Infection, *see* SUB TERTIAN, *infra*
  - in Macedonia, Alternation of, with *P. vivax* (*q.v.*, *infra*), 11
  - Phases of: Causation Problem, 4–5, 11
  - Sporulation by, 2
    - Place of, 4
  - Seasonal Prevalence, Macedonia, 287
- *P. malariae*
  - Distribution of, in Fatal Case, 295
  - Infection, *see* QUARTAN

Malaria—*cont.*
  Plasmodia—*cont.*
    P. praecox (*falciparum*, *q.v.*) in Autochthonous French Case, 288
    P. tenue, 35
    P. tenue-like in Earliest stages, later changes in, 36
      and Other Atypical forms: Accra, 210
    P. vivax, 288, 306
      Action on, of
        Luargol, 30
        Optochin, 23–4
        Quin. bihydrochlor, Intravenously, 1
        Quinine, Orally for two Consecutive Days only, 298
        Tartar Emetic, 301
      Alternating with *P. falciparum* (*q.v.*, *supra*), 11, 296
      Anopheles Hosts of, 32
      in Blood on Admission and before Discharge, 284
      Co-existent with *P. falciparum*, 284–5
      Experiments on, with Various Substances; Technique, 34
      Infection, *see* TERTIAN, BENIGN
      Near Lake Presba, Albania, 11
      Seasonal Prevalence: Macedonia, 287
    P vivax, var *minuta*, 35
  Polyneuritis as Disguise of, 9
  Post-mortem Findings in
    Macedonian Military Cases, 31
    Quartan Case, 295
  Primary Infections: Seasonal Differences between, 284
  Prophylaxis, 38, 284, 308
    Antimalarial Measures, Campaigns, Surveys, &c., 8 38, 282, 283, 286, 304–5, 305–6
    Carrier Control, U.S.A., 305
    in Cases with Parotitis, 294
    Culicifuges, 289
    Drainage, &c., 283, 304, 305
    Intensive Culture, relative Value of, to Anti-Mosquito Campaigns, 283
    Larvicides
      Ducks: Failures, 280
      Fish: Failures, 280
      Saprol, 307
    Military, in the Field, 5–6, 289
    Netting, 289
    Oiling, 305
    Principles governing, 6, 38
    Quinine and Quininisation, 4, 6, 21, 23, 279, 280, 282, 283, 286, 287, 289, 290, 297, 305, 306, 308

Malaria—*cont.*
  Prophylaxis—*cont.*
    Quininisation
      Military for Armies in the Field, 6
      Muscat Plan, 6
      of Native Carriers: Algeria, 8
      Occasional Failure of, 21
      Rules for Adults, 309
    Screening, 289
      Chimneys Capped, 305
  Protean character in Balkan Regions, 9–10
  Pseudo-Appendicitis, simulated by, Balkans, 10
  Pseudo-Peritonitis simulated by: Balkans, 10
  Pseudo-Relapses in, 4

  QUARTAN
    Incidence
      Class: Troops, 284
      Geographical
        California, 7
        France (Indigenous), 289
        French Guiana, 7
        Morocco, 7
        Sarajevo, 284–5
    Fatal Case, 295
    Transmission Experiments with Flying Foxes, 33

  Quinine, *see also under* Prophylaxis, *and* Treatment
    Behaviour in Human Body, 299
    and Cinchonine; Salts of, Experiment on, 23
    Recent Conclusions on, 19, 286
  Quinine Concentration in Blood; Estimation of, 299–300
  Quinine Excretion in Urine, in Habitués and others, 299–300
  Quinine Habituation; Drawbacks of, 20, 21 *et sqq*
  Quinine Idiosyncracy, Cases of, 24
  Quinine-Rash, 308

  QUOTIDIAN
    Plasmodial changes in; Goa, 36

  Rash in, 17, 293, 308
  Recognition of, 285
  References to Literature, xv-xxi, lvi-lxii
  Re-Infections in Chronic Cases; Characteristics of, 284
    by Reiterated Mosquito-bites, 288
  Relapses and Relapse Cases, 12–13, 27, 287
    Causation Theories, 2–3, 4, 5, 13, 21, 283, 285
    Form of Quinine Administration as concerned with, 21
    Impending: Detection by Liver Percussion, 293

- **Malaria**—*cont.*
  - Relapses, &c.—*cont.*
    - Optochin not Suppressive of, 300
    - Pathogeny of, and Post-mortem Findings, 283
    - Prophylaxis, 19, 20
    - Treatment
      - Arsenic and Iron, 20
      - Hygiene, 20
      - Quinine: Small doses: Prolonged course, 23
      - Quin. bihydrochlor. 21
      - Quinine-Neosalvarsan, 24–5
  - Relapsing Fever in relation to, 198, 200
  - Rice-culture in relation to, 291, 310
  - Schüffner's Granules and Maurer's spots in: Evolution of, 303
  - Special Wards for Acute and Chronic, 290
  - Spleen Census, Trinidad, 6
  - Spleen-Index in relation to *A. rossi*; Khewra, 280
    - of Children: French Guiana, 7
  - Spleen-Examination: Military Importance, 6
  - Splenomegaly
    - in Apparently Healthy Indian Soldiers, 5
    - in Rumania, 287

  - SUB-TERTIAN
    - Alternating with Benign Tertian: Macedonia, 11
    - *A. maculipennis* of Paris Region Infectible with, 33
    - Arneth Index in, 292
    - Associated with Rice Culture and Irrigation in Portugal, 310
    - Cerebral
      - Treatment by Galyl and Quinine, 27–8
      - with Coma, &c., Treatment: Recovery, 17–18
    - Cure by Quin. Ac. Hydrobrom, 297
    - Disguise forms, 9
    - Fatal, in Wounded Man: Possible Errors indicated, 296
    - Gangrene in, in Young Men, 16
    - Globular Resistance during, 302, 303
    - Incidence
      - Class, 282
      - Geographical
        - Accra, 210
        - California, 7
        - France, 289
        - French Guiana, 7
        - Italy, 282, 308
        - Macedonia, 11, 288, 306
        - Morocco, 7, 288

- **Malaria**—*cont.*
  - SUB-TERTIAN—*cont.*
    - Incidence—*cont.*
      - Geographical—*cont.*
        - Portugal, 310
        - Virgin Islands, 217
      - Season, 11
    - Maurer's dots in, 303
    - Plasmodia of
      - *P. falciparum*
        - Action on, of
          - Luargol, 30
          - Salvarsan, 222
        - in Blackwater Fever: Albania, 42
        - in Brazil, 35
      - Phases of, How Conditioned, 4–5
    - in relation to Police Court Cases in Tropics, 295
    - Symptoms
      - Myocarditis, 20
      - "Pernicious," Causation-Theory, 4
      - Tetanic, 17
    - Transmission Experiments on Flying-foxes, 33
    - Treatment of, by
      - Atoxyl, 20
      - Galyl, 2
      - Luargol, 30
      - Optochin, 24
      - Quinine, 1, 21, 22, 27, 282, 297
      - Soamin, 20
      - Tartar Emetic, 2, 28–9, 301

  - Sunlight in relation to Relapses, 283, 288
  - Suprarenal Complications: Symptoms and Treatment, 292, 309
  - Surgery in relation to, 290
  - Symptoms: All forms, 9–10, 15, 16, 17, 19, 20, 31, 215, 281, 293–4, 295–6, 302, 309, 310
    - in Atypical Cases, 17, 18–19
    - Irregularity and Disguise of, 8–10
    - New Blood Symptom, 309
    - Spurious Acute Abdomen, 290
    - Unusual, 281
    - Urticarial, 293
  - Temperature, Scheme of, as Basis for Treatment, 310

  - TERTIAN, BENIGN
    - Acquired in France, 14
    - *A. maculipennis* of Paris Region Infectible with, 33
    - Arneth Index in, 292
    - Arterial Tension in, 15
    - Chronic: Failures in, of Splenox, 297
    - Diagnostic Difficulties, 18–19
    - Double; Diagnostic Difficulties, 18

Malaria—*cont*
  Tertian, Benign—*cont.*
    Incidence
      Class, 282, 283
      Geographical
        Albania, 296
        England, 13
          Sheerness, 290
        France, 289
        French Guiana, 7
        Germany (East Prussia), 283
        Italy, 282, 308
        Macedonia 11, 295, 306
        Morocco, 7
        Portugal, 310
        Rumania, 287
        Russia, North-West (Epidemic), 12–13
      Season, 11
    Maurer's dots in, 303
    Plasmodia of
      P. vivax
        Action on, of
          Luargol, 30
          Optochin, 23–4
        Appearing in Tropical Malaria after Quininisation, 21
        in Blackwater Fever: Albania, 42
        Development of, in Mosquito as influenced by Low Temperature, &c., 32
        Rapid Method of Detecting, 36
    Relapse, in Mixed Infection with Subtertian, induced by Tartar Emetic, 2
      Quinine-fastness, in relation to, 12
    Schüffner's Granules in, 303
    Symptoms: Cerebral, Severe, 295–6
    Transmission Experiments on a Chimpanzee, 33
    Treatment by
      Amylopsin and Trypsin, 27
      Luargol, 30
      Optochin, 300
      Quinine, 1, 26–7, 297, 298
      Salvarsan, 286
      Tartar Emetic, 28–9, 301

  Thrombosis of Arterioles due to, 295
  Transmission by
    Anopheles (*q.v.*, *supra*), 32–3, 280, 281–2, 283, 287, 289–90, 291, 304, 305, 306, 307, 310, 311
    Human Carriers, 32
      Returned Soldiers, 12, 14, 15
  Transmission-Experiments on Animals, 33
  Traumatism as affecting Malarial Diathesis, 290, 296

Malaria—*cont.*
  Treatment, 12, 38
    Drugs, &c., Employed
      Adrenalin, 8, 290, 292
      Aethylhydrocuprein, 23–4
      Amylopsin and Trypsin, 27
      Antihaemolytic, 302
      Arrhenal, 8
      Arsalyt, 202–3
      Arsenicals, 287
      Arsenicals with Quinine, 8, 299
      Atoxyl, 20
        and Quinine, 8
      Autohaemotherapy, 8
      Bleeding, 281
      Blood-restorative Method, 30
        Luargol, 30
        New Specific, 30
      Galyl, 281
        and Quinine, 27–8
      Hectine, 30
      Hydrotherapy, 38
      Iron and Arsenic, 292
      Lemon-Sodium Combination, of Willis, 30
      Luargol, 30
      Methylene Blue, 23, 29
      Neosalvarsan, 23, 29
        Death from, 296
        Quinine-Combined, 25
      New "Specific," 30
      Novarsenobenzol, 290
        and Quinine, 8
      Nucleo-hexyl, 286
      Optochin, 23–4, 300
      Quinine
        Post-Discharge, 301
        Rules concerning Adults, 309
        Views on Use of, 21–3, 29, 30
      Quinoidine, 300
      Serotherapy, 302
      Soamin, 20
      Tartar Emetic, 20, 28–9, 301–2
    Experiments in, 8
    Principles Governing, 10
    Provisional Instructions for, in U.K., 19
    Scheme of Temperature as Basis for, 310
  Tremor in, 191, 294
  Tropical (*P. falciparum* Infection), *see* Sub-Tertian, *supra*
  Uric Acid and Purin Excretion, 309
  Urine-Excretion of Quinine in Quinine Habitués and Others, 299–300
  Warnings on Prospective Recrudescence of the Disease in France, 38
  Wassermann Reaction in, 304
  Wounds as Arousing Latent or Dormant, 290, 296

Malta Fever, *see* **UNDULANT FEVER**

- **MISCELLANEOUS,** 210–39
  - Acute Inflammation of Outer Ear Passage in Man; East Africa, 223
  - Appendicitis, 98
    - Rare at Accra, 210
  - Arisaema Poisoning: China, 225
  - Arneth Counts in Children; North and East Australia, 229
  - Bael Fruit, Unripe, Medicinal Use of 218
  - Blastocystis: Egypt, 43
    - *B. enterocola*: Accra, 210
    - *B. hominis* and Ova in Faeces
      - Brazil, 67
      - Omdurman, 63
  - Blastomycosis: Complement-Fixation Methods in, 227
  - Blood
    - Reducing Power of, in the Tropics, 221
    - Sugar Content of, in the Tropics, 221–2
  - Blood Conditions, *see* Arneth Counts, *and* Leukaemia
  - Bronchial Catarrh, 200
  - Broncho-Mycosis: Balkan-Adriatic Region, 215
  - Broncho-Pneumonia, 200
    - in Filipino Children, 215, 216
  - Cardiac Affections of Filipino Children, 216
    - and Vascular Complications due to Malaria, 10
  - Cellulitis, Diffuse, Heliotherapy for, 232
  - Chemotherapy
    - Emetine, *see also under* **AMOEBIASIS**
      - Diarrhoea due to, 227
      - Diseases in which of Service, 228
      - Proper Employment of, 228–9
    - Santonin-Substitute, 218
  - Children's (Native) Diseases, in the Philippines, 215–16
  - Cholecystitis Syndrome, Malaria simulating: Balkans, 10
  - Cod-Liver Oil in Rickets-Prevention, U.S.A., 221
  - Cold, Effect of, on Tropical Natives; Prophylaxis, 231
  - Colitis, Muco-Membranous; Emetine in, 228
  - Creosote for Destruction of Flies at all Stages, 236–7
  - Diabetes Innocens, in the Tropics, 221–2
  - Diarrhoea: Emetine-caused, 227
  - Diarrhoeal Diseases; Yeasts Isolated from: U.S.A., 233
  - Diphtheria: Schick Test for, with Special reference to Negroes, 225

- **Miscellaneous**—*cont.*
  - Enteritis
    - Influence on, of Anti-Typhoid Inoculation, 64
    - Prior to Mixed Dysenteries, 61
  - Eye-Affections, *see* Iritis, Presbyopia, *and* Trachoma, *infra*
  - Fistula in Ano, Heliotherapy for: Tunis, 232
  - French Dispensaries and Hospitals in China and Siam, 216–17
  - Fruit-Eating Bat, as Laboratory Animal in Tropical Africa, 235
  - Fungi, *see also Monilia, under* **Sprue**
    - Nocardia, undetermined sp. from Accra, 210
    - Thrush-Causing: Sprue Fungus Similar to, 233
  - Funiculitis, Endemic: Macedonia, 215.
  - Glycosuria (*Diabetes innocens*) in the Tropics, 221–2
    - Race-Incidence, 222
  - Haemorrhage in Filipino Infants, 215
  - Heliotherapy, Applications of: Tunis, 232
  - Indigenous Drugs, &c., 218
  - Influenza, 200
    - Brazil (Epidemic, 1916), 182
  - Iritis, Syphilitic; Arneth Counts in, 230
  - Koorchi, Medicinal Use of, 218
  - Lathyrism in Man and Animals, 224
  - Leukaemia in Natives of West Africa, 220
  - Linseed Oil as Substitute for Cod Liver Oil, 218
  - Liver Cirrhosis, with Ascites and Rectal Biopsy: Balkans, 10
    - Infantile Biliary: Bengal; Symptoms, Mortality, and Treatment, 222–3
    - Congestion, Emetine in, 228
  - Low Fever in the Tropics, attributable to Glycosuria, 222
  - Meningitis, *see also* **CEREBRO-SPINAL MENINGITIS**
    - Suppurative and Tuberculous, in Filipino Children, 216
  - Olive Oil not Substitute for Cod Liver Oil, 221
  - Pancreatitis, form of, Simulated by Malaria: Balkans, 10
  - Phthisis Haemoptysis of: Emetine in, 228
  - Plant-Poisoning, *see* Arisaema Poisoning, *and* Lathyrism, *supra*
  - Plantain Leaves, Medicinal Uses of, 218

Miscellaneous—*cont.*
- Pneumococcal Infections among Blacks employed in France; Symptoms; Fatality; Post Mortem Findings; Treatment, &c., 226–7
- Pneumonia, in
  - Black Troops in Europe, Albuminuria and Pneumococcus present, 231
  - Black Workmen: Toulon; Fatality; Post Mortem Findings: Treatment, &c., 226–7
  - Croupous, in Coal Miners: Dutch Indies, 225
  - Double Malaria Complicating, 286
  - Lobar and Lobular, in Filipino Children, 216
- Poliomyelitis, Acute, Anterior, Summary of Recent Information on, 128
- Presbyopia, in Natives: Dutch Indies, 224
- Purpura Haemorrhagica, Epidemic Scorbutiform, in Italian Troops in Alps, 220
  - Rheumatic, Scorbutiform on Italian Front, 219
- Quartan, Non-Malarial, Fever
  - Incidence
    - Ceylon, 214
    - Europe, 214
- Rabies Statistics of
  - Pasteur Institutes at
    - Coonor, 211–12
    - Weltevreden, 212
- Rash, due to Flea Bites; Balkan Region; Possible Mistakes regarding, 213
- Rations in relation to Disease in Mesopotamia, 234
- References to Literature, xxx–xl, lxx–vii
- Respiratory Diseases in Filipino Children, 215, 216
- Rickets in Negroes: New York district: Prophylactic Treatment, 221
- Scarlet Fever; Differentiation from Erythema Scarlatiniforme, 398
- Sciatica, 200
- Scorpion Poison; Experiments on, 220
  - References to Literature, xxx, lxxi
- Septicaemia, Pneumococcal, in Blacks in France: Fatality, 226
- Skin-Grafts; Heliotherapy Beneficial to, 232
- Sporotrichosis; Tissue Changes in, resembling those in Tuberculosis, 406

Miscellaneous—*cont.*
- Sprouting of Grains, issued as Troop-Rations: Anti-Scorbutic Value of, 230
- Still Births, Causes of
  - Java, 219
  - Philippines 216
- Sugar Content of Blood in the Tropics, 221–2
- Thrush: Fungus Causing, Sprue Fungus Similar to, 233
- Trachoma: Heredity in relation to, 232–3
  - Incidence
    - Geographical
      - Japan, 232
      - Tonkin (Hanoi), 233
    - Sex, 233
  - Proposed Methods of Combating, 232
  - Relationship of Patients, 232–3
- Trench Nephritis; Relapse Case; Contra-indication for Inoculation for Bacillary Dysentery (*q.v.*), 59
- Tumours, Rare in Filipino Children, 216
- Urethritis, Non-Gonorrhoeal; Six Varieties, in Balkan-Adriatic Zone, and in the Tropics, 215
- Uro-Genital Organs, Diseases of; Balkan-Adriatic Zone, 215
- Vaccine Preparations, Bombay Laboratory, 211
- Vaccinia, Generalised, in Sudan Natives, 224
- Venereal Disease, *see also* Gonorrhoea, *supra*, *and* **Syphilis**
  - Etiology, 217
  - Prophylaxis: for Coolies Imported into Sumatra, 218–19
  - in Virgin Islands, 217
- Yeast-like Fungi of the Human Intestinal Tract, 233

Moniliasis, *see* **Sprue**

Mycotic Diseases, *see under* **MISCELLANEOUS, SKIN DISEASES** *and* **Sprue**

Nematode Infections, *see under* **HELMINTHIASIS**

Onchocerciasis, *see under* **HELMINTHIASIS**

Oriental Sore, *see* DERMAL LEISHMANIASIS, *under* **KALA AZAR**

Oxyuriasis, *see under* **HELMINTHIASIS**

Pappataci Fever
- Diagnostic Differentiation from Typhus, 213
- Incidence
  - Class, 183
  - Geographical
    - Balkan-Adriatic Region, 213, 214
    - Waziristan, 183
- Insect Vectors, *see* Phlebotomus, *infra*
- Leucopenia as Diagnostic, 213
- Misdiagnosed as Dengue: Macedonia, 213
- Phlebotomus sp. as Vectors
  - *P. legeri*; Where found, 238
  - *P. minutus*; Where found, 238
  - *P. papatasii*; Day and Night Biting, Balkan-Adriatic Region, 213
    - Where found, 238
- Rash, 213
- References to Literature, lxii

Paragonimiasis, *see under* **HELMINTHIASIS**

Paratyphoid Fever, *see under* **ENTERIC FEVERS IN THE TROPICS**

Pellagra
- Disease Resembling (Chichismo); Ecuador, 218
- Etiology, 217
- Incidence
  - Geographical
    - America, U.S., 233
    - Porto Rico, 387
    - Spain, 245
    - Virgin Islands, 217
- References to Literature, xxi–iv, lxi–ii
- Serological Reaction in, 278
- Sprue Misdiagnosed for, 276
- Tests with Cultures of *Monilia psilosis*, 278
- Uncinariasis Associated with, 387
- Yeasts Isolated from, 233

Phlebotomus Fever, *see* **Pappataci Fever**

PLAGUE, 459–69
- Anti-Anaphylatoxin, and Proteotoxin-Resistance; Experiments on, 466–7
- Anti-Plague Vaccine Manufacture: Bombay, 211
- Bacteriology
  - Bacillus (i)
    - *B. pestis*
      - in Cat: Japan, 469
      - Selective Medium for Isolating, 468

Plague—*cont.*
- Bacteriology—*cont.*
  - Bacillus (i)—*cont.*
    - *B. pestis*—*cont.*
      - Transmission Experiments on, with
        - Bugs, 459–60
        - Rat-Fleas (Indian), 460
- Black Fever (Typhus) misdiagnosed as (in Epidemic of 1900), 127
- Bugs as Possible Vectors; Experiments with, 459–60
- Fleas (*see also* Rat-Fleas, *infra*) as Vectors, 460 *sqq.*, *tables*, 461, 462
  - Indian: Duration of Infection of, 460
- Infection-Duration in Indian Fleas and Rats, 460
- Incidence
  - Case: Various Districts, Java, 462
  - Geographical, *see also under* Each Form
    - Dutch East Indies, 462–3

- PNEUMONIC
  - Cause (Tibetan epidemic), 463
  - Incidence
    - Geographical
      - Manchuria, 463
      - Tibetan Border, 463
  - Treatment
    - Eusol, Intravenously, 465–6

- Prophylaxis
  - Methods Disliked in Java, 463
  - Rat Destruction on Ships; New Orleans Fumigants' Efficiencies, 464–5
  - Tar dipped Shirts, 235
  - Tibetan Border Methods, 463
- Rat-Fleas; Percentages on *Mus decumanus* and *Mus rattus griseiventer*: Java, 460
- Rats as Agents of Spread, 462–3
- Rats, Indian; Duration of Infection in, 460
- References to Literature, xxii, lxiii–iv
- Transmission by
  - Bugs; Experiments on, 459–60
  - Fleas, 460 *sqq.*, *tables*, 461, 462
  - House-Rat: Java, 462
  - Migration, 463
- Treatment *see also* Each Form
  - Quinine and Carbolic Acid, 69

- RAT-PLAGUE
  - Incidence
    - England (Bristol), 464
    - Japan, 460–2, 469
    - Java, 462
  - Septicaemic; *B. pestis*-like Organism in: Japan, 469

Polyneuritis Avium, *see under* **BERIBERI**

PROTOZOOLOGY (excluding Amoebae and Most Trypanosomes), 417–31
- DISEASES OF PROTOZOAL ORIGIN AND THEIR PARASITES
  - Anaplasmosis, Bovine, in
    - Russia, 429
    - Turkey in Asia, 429
    - Parasite
      - *Anaplasma centrale*, 429
  - Blastocystis, in Mixed Infection, 420
  - *Chilomastix mesnili* Infection; Other Parasites present, 420
  - Coccidiosis, in the Balkan-Adriatic Zone, 214
  - Nuttalliasis, Equine: Morocco, 430
    - Parasite, *Nuttallia equi*, 430
  - Piroplasmosis
    - Bovine
      - Carrier, 429
      - Incidence
        - Panama, 429
        - Russia, 429
        - Turkey in Asia, 429
      - Mortality, 429
      - Parasites
        - Piroplasma
          - *P. annulatum*, 429
          - *P. bigeminum*, 429
      - Probably Tick-spread, 429
    - Equine; Morocco, 429–30
      - Parasite
        - Piroplasma
          - *P. caballi*, 430
  - Prophylaxis: Sole Means of Securing Efficient, 417
  - Toxoplasmosis of Gondis: Parasite, 425
  - Trench Fever: Organisms found in, 430–1
  - Trichomoniasis
    - Arneth Counts in, 230
    - Parasites
      - Trichomonas
        - *T. intestinalis*: Accra, 210, 230
        - *T. vaginalis*: Accra, 210
- PROTOZOA
  - Balantidium, in Horses, 430
  - Blastocystis, Product of Cell-Necrobiosis, 417
  - Bodies in Blood of African Snakes, 418–19
  - Calonympha, 423
  - Chilomastix genus; History of, 420
    - *C. mesnili*; in Brazil: alone, and with *Enteromonas hominis*, 424
      - Cysts, 417
        - Formation, 420

Protozoology—*cont.*
- PROTOZOA—*cont.*
  - Chilomastix genus—*cont*
    - *C. mesnili—cont.*
      - Description, 420
      - Distribution, 420
      - History, 420
      - Pathogenicity and Treatment, 419–20
      - Synonyms, &c., 420
  - Coccidia: Egypt, 43, 44
  - Copromastix
    - *C. prowazeki*, n.g., n. sp.; Description and Diagnosis of genus, 421
  - Enteromonas genus, 420, 421
    - *E. hominis* in
      - Woman: Sudan; Characteristics: Symptoms due to, 421–2
      - Mixed Infections with *Chilomastix mesnili*: Brazil, 424
  - *Euflagellata*: Diagnostic Tables of, 420
  - Flagellata
    - Causation by, of Dysentery, or Diarrhoea, not proven, 270
    - of Invertebrates: Plurality of, 425
    - Parasitic: Brazil, 424
    - from Vaginitis Cases: Accra, 210
  - *Gymnonympha*, 424
  - Haemamoebidae: Franca's Classification, 426
  - Haematozoa of Birds, 417–18
  - Haemogregarina
    - Franca's Classification, 426
    - Haemogregarine in *Phyllodactylus gerrhopygus*, Described, 428–9
    - *H. bicapsulata*, Cyst-formation in Cells infected with, 427
    - *H. didelphydis*, n. sp., in Opossums, 428
    - *H. hominis* n. sp., in Chinese, Described, 427–8
    - *H. unnamed*, of Trench Fever: Discussed, 431
    - Schizogony of, 427
  - Haemoproteus; Avian Hosts of, 418
    - *H. tinanculi*; Schizonts of, in relation to *Schizo. cruzi*, 167
  - Haemosporidia
    - Biology of, 427
    - Classification of, 425–7
  - Haemotrichomonas
    - *H. columbae*, 423
    - *H. gallinarum*: Eritrea, 422–3
    - *H. ophidium*, 423

Protozoology—*cont.*
  PROTOZOA—*cont.*
    Hepotazoa; Franca's Classification, 426
    Herpetomonads in Bugs: Survival to reach Rectum, 143
    Herpetomonas Infection, of *Musca domestica*: Accra, 238
    Holomastigotoides, 424
    in Human Faeces; relative Numbers in 477 Cases, 67
    Intestinal, *see also* Amoebae, *Lamblia*, *&c.*, *under* **AMOEBIASIS**, *and* **DYSENTERY**, FLAGELLATE
    Joenia, 423
    Lankesteria culicis, in *Stegomyia fasciata* Larvae: Accra, 238
    Leidya n.g., 423, 424
      L. metchnikovi n. sp., 423, 424
    Leucocytozoa
      L. Martyi, in Birds: Bamako, 418
    Lophomonas, 423
    Mastigophora: Diagnostic Tables of, 420
      Fantham on, 417
    Microfilaria in Birds, 418
      M. bernardi: Bamako, 418
    Monozoa; Diagnostic Tables of, 420
    Octomitus dujardini: Where Found, 424
    Parasitic to Man; Probable Evolution, and need for Study of, 417
    Phylogenetic Relationships of Genera, with Diagram, 419, 420
    Piroplasmata
      Organism provisionally Classed with, found in Trench Fever, 430–1
      Ticks acting as Vectors, 429
    Proteosoma, Unpigmented, of Canaries and Ducks, 430
    Protomonadina: Diagnostic Tables of, 420
    Pseudotriconympha, 424
    Spirochaetes, *q.v.*, *also under* **RELAPSING FEVER**
      Considered as Protozoa, by Nuttall, 196
      Experimental Infection with, of Fowls (Spiroschaudinnia), 422–3
      Fantham on, 417
      Symbiosis of, with Fusiform Bacilli, 222
    Spiroschaudinnia, *see* Spirochaetes, *supra*
    Stephanonympha, 423
    Tetramitidae fam.; genera of, 420

Protozoology—*cont.*
  PROTOZOA—*cont.*
    Tetramitidinae, 420
    Theileria parva, Schizonts of, indistinguishable from those of *T. cruzi*, 167
    Trichomastix sawii, n. sp.; Brazil; Described, 424
    Trichomonas
      Cysts: Researches on, 422
      Mode of Entry into Mucous Membrane of Caecum of Turkeys, 251
    Triconympha, 424
    Triconymphidae: Franca's Classification, 423, 424
      T. agilis, 423, 424
    Toxoplasma gondii; Possible Insect Vectors, 425
    Waskia wenyoni, n. sp., of *Oebus curaya*: Brazil, 424

  References to Literature, xxxviii–ix, lxxviii–ix

Pyrexia of Uncertain Origin
  Arneth Counts in, 230
  Differential Diagnosis from Typhoid, 438

Rat-Bite Fever, or Sodoku, 189–93
  Cat-Bite Caused, 191
  Cat-Bite Disease: Japan 192–3
    Identity with Rat-Bite Disease, 192, 193
    Spirochaete present, 193
    Symptoms, 192
    Treatment by Salvarsan, 193
  Etiology: Spirochaetal Infection, 189–90
  Immunity Substances in Serum, 190-1
  Incidence
    Geographical
      Balkan-Adriatic Region, 214
      Dutch Indies, 191–2
      Portuguese India (Goa), 191
  Pathology, 190–1
  References to Literature, xxx, lxxi
  Spirochaetes in: Two types, 189, 190
  Spirochaetosis in Guinea-pigs: Causal Agent believed Identical with that in Rat-Bite Fever, 192
  Treatment by
    Neo-Salvarsan, 191, 192
    Salvarsan, 189
    Water of Holy Well, &c., 191

RELAPSING FEVER & other Spirochaetoses, 195, 209
  Atypical, Albania, 201
    Parasite of, and Spirochaetes in, 201
    Post-mortem Findings, 201
    Treatment, 201
  Bed-bugs as Vectors, 195

Relapsing Fever—*cont.*
- Co-incident with Typhus; Balkan Region, 213
- Comparison of, with Weil's Disease, 407
- Complications, 197, 199, 200
- Concurrent with Malaria, 198
- Diagnosis, 200
  - Gait as Hint for, 199
  - Leucocyte Formula useful in, 197
  - Mistakes in, 200
- Diagnostic Difficulties at Onset, 213
- Diet Deficiency in relation to, 199
- Fleas as Vectors, 199
- Gait as Early Diagnostic Sign, 199
- Incidence
  - Class, 197, 199, 200
  - Geographical
    - Africa, Central (with Malaria), 198
    - Albania, 201
    - Algeria, 201–2
    - Balkan-Adriatic Region, 198, 199, 213
    - Bulgaria, 202
    - German East Africa, 197
    - German Eastern War-Front, 199, 200
    - Macedonia, 197, 202
    - Manchuria, 203
    - Perso-Turkish War Front, 199
    - Turkey, 202
    - Victoria Nyanza Region, 222
  - Race, 199, 222
- Incubation Period, 196
- Infective Jaundice (Weil's Disease), *see* SPIROCHAETOSIS ICTEROHAEMORRHAGICA *infra*
- Insect Vectors, *see* Fleas, *supra, and* Pediculi, *infra*
- Malaria in relation to, 198, 200
- Other Diseases Coincident with, 213
- Pediculi as Vectors, 213
  - *P. humanus*, 195–6
  - Mode of Infection by, 196
- References to Literature, xxiii–iv, lxiv–v
- Rash in, 213
- Spirochaetes referred to
  - Action on, of Emetine, 54
  - Causing, in Manchuria
    - Experiments on, 203
    - Fission Method: Investigation of, 203
  - Considered to be Protozoa, by Nuttall, 196
  - in Fever free Intervals: Albanian Case, 201
  - of Human Intestine: Cultivation of, *in vitro*, 204
  - Length as means of Distinguishing Smaller ones, 203–4
  - Morphology of those of Vagina, Throat, and Bladder, 203–4

Relapsing Fever—*cont.*
- Spirochaetes referred to—*cont.*
  - Nodosities on: Italian War-Front, 206
  - Persistence of, in Lice; Infectivity of the Latter, during Invisibility of Former, 195, 196
  - *S. bronchialis*; Coryza-like Affection due to, 215
  - *S. icterohaemorrhagiae*
    - American, Japanese, and Belgian; Probable Identity of, 205
    - as Causal Agent, 210
    - Culture Media for, 205
    - Vitality of, in Kidney, after Death of Patient, 208-9
    - in Wild Rats
      - America U.S., 204–5
        - Bibliography, &c., 205
        - Morphology, 205
      - Brazil, 206
      - Japan, 209
  - *S. marchouxi*; Length-Measurements of, 204
  - *S. recurrentis*; *Pediculus humanus* as Carrier of, 195
  - *S. vaginalis*, Length of, 203
  - in Urine, 202
- Spirocheto-Plasmodic Fever of the Serbs, 198
- Symptoms, 197, 198, 199, 200
  - Psychical, with Delirium: Algeria, 201–2
- Transmission by
  - Fleas, 199
  - Pediculi, 195–6, 213
- Treatment, 196, 197, 199
  - Arsalyt, 202–3
  - Kharsivan, 202
  - Neo-Salvarsan; Inefficacy of, with Rumanians, 199
  - Salvarsan, 222
    - with Tartar Emetic, 213
  - Treatment by Galyl, 207
- Wassermann Reaction in, 207
- Vitamine Deficiency in Relation to, 199

OTHER SPIROCHAETOSES

- AVIAN
  - Parasites associated with
    - *S. gallinarum*. Mortality due to, 418
    - Spiroschaudinnia: Eritrea, 422

- BRONCHIAL, 199–200
  - Incubation-period; Symptoms; Spread; Treatment, 200

- BRONCHO - SPIROCHAETOSIS, in Balkan-Adriatic Zone, 215

Relapsing Fever—*cont.*
- OTHER SPIROCHAETOSES—*cont.*
  - RHINOPHARYNGITIS SPIROCHAETICA, Coryza like: Balkan-Adriatic Region, 215
  - SPIROCHAETOSIS ICTEROHAEMORRHAGICA, or Weil's Disease
    - Bilious Typhoid, in relation to, 207–8
    - Characters of, on Italian War-Front, 206
    - Experimental Means of Infection, 208
    - Immune Body in Serum: Efficacy of, 191
    - Incidence
      - Geographical
        - Balkan-Adriatic Region, 214
        - Brazil (possible), 206
        - Eastern War Front, 200
        - Italo-Austrian War Front, 206
        - Japan, 208, 209
        - Peru (in a Japanese), 209
    - Post-mortem Vitality of *S. icterohaemorrhagiae* in Kidney, 208–9
    - Spirochaetes in: Locale of, 189, 190
    - Transmission, 207
    - Treatment by Serotherapy: Methods used, 208
  - TRENCH FEVER—Is it a Spirochaetosis? 207
  - Tropical types; Locales of, 206

REPORTS OF LABORATORIES, &c., *see also* Separate INDEX TO APPLIED HYGIENE
- Accra (1916), 210, 229, 238
- Bombay Bacteriological (1915 & 1916), 211
- Pasteur Institute
  - of Southern India, Conoor, 1916–17, 211–12
  - Weltevreden (1916), 212
- References to Literature, xxxii, lxxii
- Vaccination Bureau Weltevreden (1916), 212

REVIEWS OF BOOKS, 70–2, 158–9, 240–2, 312–16, 470–1
- Consumption, Treatment at Home and Rules for Living (Crowe & Sprawson), 72

Reviews of Books—*cont.*
- Diabetes, Its Causation and Treatment (with Special Reference to India), (Waters), 470–1
- Human Intestinal Protozoa in the Near East [British Troops and Native Carriers], with Special Reference to the Carrier Question, Diagnosis and Treatment of Amoebic Dysentery, and an Account of Three New Human Intestinal Protozoa (Wenyon & O Connor), 314
- Kala Azar, Its Treatment (Brahmachari), with foreword by Hon. Surgeon-Gen. W. R. Edwards, 71–2
- Laboratory Studies in Tropical Medicine (Daniels & Newham), 240–2, 315–16
- Leishmanioses, Kala Azar, Bouton d'Orient, Leishmaniose Américaine (Laveran), 70–1
- Maatregelen tegen Malaria [Prevention of Malaria]. (Fischer), 312–13
- Principles, The, of Acidosis, and Clinical Methods for its Study (Sellards), 158–9
- Tropical Diseases, A Manual of the Diseases of Warm Climates (Manson), 313–14

Ringworm, *see* Tinea, *under* **SKIN DISEASES, TROPICAL**

Rocky Mountain Spotted Fever, 186–8
- Bodies in Blood in, 186–7
- Incidence
  - Geographical
    - America U.S.
      - California, 186–7
      - Montana, 186–7
- Pathological Conditions, Experimental, 126
- Prophylaxis, 186, 187
- References to Literature, xxx, lxxi
- Resemblance to Typhus, and Non-Identity of, 141, 188
- Ticks as Vectors, 186–8
  - Hosts of, 186–8
- Virus: Laboratory Investigations of, 186–8

Round-Worm Infection, *see* ASCARIASIS, *under* **HELMINTHIASIS**

Sandfly Fever, *see* **Pappataci Fever**

Sandwith, Dr. F. M., C.M.G., Death of, 242

Schistosomiasis, (Bilharziasis), *see under* **HELMINTHIASIS**

Scurvy
- Anti-Scorbutic Advantage of Causing Food-Grain to Sprout, 230
- Antiscorbutics, 234
- Anti-Scurvy Vitamines: Experiments on, 175-6
- Barcoo Rot, and, 188
- Etiological Theory (Deficiency), 175
- Food Stuffs as Preventives of, and of Beriberi: Relative Values (*table*), 177
- Gait in, 199
- Incidence
  - Class, 234
  - Geographical
    - Mesopotamia, 176, 234
  - Race, 176, 234
- Malaria Resembling: Balkan Regions, 9
- Meat Diet as Prophylactic, 176
- Preparation of Germinating Legumes for Prophylactic Diet, 177

Seven-Day Fever, *see* **DENGUE**

SKIN DISEASES, TROPICAL (*see also* DERMAL LEISHMANIASIS *under* **KALA AZAR**, *and* **YAWS**), 387–400
- Acnitis, in Negro, 400
- Ainhum in Hindu, possibly Syphilitic, 399
- Barcoo Rot (Veldt Sore), New South Wales; Causation: Treatment, 388
- Blastomycosis, 387
- Bullous Eruption due to Blister Beetles: Khartoum, 393
- Cheloid, Giant, in Dahomey Native, 399
- Creeping Disease; Japan; Characteristics: Possible relation to Ligula Infection: Treatment, 397
- Craw-Craw: Etiology, 397–8
- Dermatitis, Caused by
  - Butterflies and Moths; French Guiana, and Japan, 392
  - Micuim Insect: Brazil, 393
    - Symptoms: Treatment, 394

Skin Diseases, Tropical—*cont.*
- Dermatitis, Caused by—*cont.*
  - Rhus-Poisoning, 391–2
    - Non-Bacterial Nature of the Poison, 392
  - Occupational, *see* Oil Eczema, *infra*
- Dermatitis Scarlatiniforme, Differentiation of, from Scarlet Fever, 398
- Erythema Scarlatiniforme, Nature of, 398
- Gangosa; Dutch East Indies, 400
- Granuloma Venereum
  - Etiology, 395
  - Incidence
    - Geographical
      - Brazil, 396
      - India, 395
      - South Africa, 395
    - Race, 395
    - Sex, 395
  - Organisms Associated with, 395
  - Treatment by Tartar Emetic, 395, 396
- Keratodermia Punctata; Differentiation of, from Yaws, and from Keratodermia plantare sulcatum, 398
- Lacquer Dermatitis: Japan: Cause: Treatment, 391-2
- Larbish, *see* Oerbiss, *infra*
- Leptothrix, *see* Trichomycosis, *infra*
- Mycetoma
  - Classification and Description, 389–90
    - Actinomycoses, 389, 390
      - Treatment, 390
    - Maduromycoses, 389
      - Treatment, 390
    - Mycetoma pedis nostras: Switzerland, in Italian: Causal Agent; Treatment, 390–1
    - Paramycetoma, 389, 390
    - Pseudomycetoma, 389, 390
  - Treatment, 390
- Oerbiss or Larbish: West Africa; Cause: Symptoms; Treatment, 396
- Oidiomycosis: Porto Rico, 387
- Oil Eczema: Etiology; Sex-Incidence, 394
- Orange Coloured Skin Disease: Associated Symptoms, 399
- Otomycosis due to *Nocardia cylindracea*, S. Africa: Treatment; Cultural Experiments, 391
- Pediculosis: Porto Rico, 387
- Plant Poisoning, *see* Rhus, *under* Dermatitis, *supra*
- Pneumococcal Skin Infection in Blacks in France, 266

Skin Diseases, Tropical—*cont.*
- Pruriginous Dermatitis, due to Butterfly, 392
- Psoriasis: Porto Rico, 387
  - Simulated by Syphilide in Negro, 399
- Pyosis Tropica: Porto Rico, 387
- References to Literature, xxiv-v, lxv-vi
- Ringworm, *see* Tinea, *infra*, 387
- Scabies, Secondary, among poor Turks, 400
  - Rare in Porto Rico, 387
- Scarlet-Fever Like Eruptions, in the Tropics, 398
- Simulated by Malarial Infections; Balkan Regions, 10
- Sporotrichosis: San Paulo, Brazil; Parasite: Treatment, 389
- *Streptothrix verrucosa* n. sp., 390
- Syphilide, with Psoriasic Eruption in Negro: Treatment by Salvarsan, 399
- Tinea
  - Forms met at Porto Rico, 387
  - Fungi Associated with, 387, 388
    - Classification, 388
    - New Type, 388
  - in Australia, 388
  - *T. imbricata* in South Africa in Kaffir, 388–9
- Trichomycosis: Porto Rico, 387
- Tumours, Malignant, as Pseudomycetomata, 390
- Ulcus tropicum, 387
  - Organisms Associated with, 394, 395
  - Treatment, 394, 395
- Urticaria due to
  - Caterpillar: Rumania, 393
  - Moth: Japan, 392
- Vaccinia, Localised Gangrenous, at Khartoum: Symptoms, Treatment, 398–9
- Veldt Sore, *see* Barcoo Rot, *supra*

SLEEPING SICKNESS, and other Trypanosomiases, 161-8
- GENERAL REFERENCES
  - Average Duration of Life of Natives Infected with Trypanosomes, 161–2
  - Diagnosis by Gland Puncture, 161
  - Fruit-Eating Bat as Reservoir of Virus, 235
  - Triatoma Infected by *P. cruzi*, 166
- GLOSSINA
  - Distribution in Belgian Congo, 167–8
  - Game, Big, in relation to, 167–8
  - *G. brevipalpis*; Distribution, Belgian Congo, 167

Sleeping Sickness—*cont.*
- GLOSSINA—*cont.*
  - *G. morsitans*
    - Big Game in relation to, 167–8
    - Distribution, Belgian Congo, 167–8
  - *G. pallidipes*, Distribution, Belgian Congo, 167
  - *G. palpalis*, Distribution, Belgian Congo, 167
    - Trypanosomes of, Limits of Adaptability of, 425
- References to Literature, xxvi, lxvii
- TRYPANOSOMES
  - Culture Media, 164
  - Divisional Processes in, Compared with those in related Flagellates and *Prowazekella lacertae*, 164
  - Infection with; Average Duration of Life after, 161–2
  - Monomorphic, of Man: Comparisons with *T. vivax*, 162
  - *Schizotrypanum cruzi, see T. cruzi, infra*
  - *T. ardea*, in Birds: Distribution, 418
  - *T. berberum*: Variety of *T. soudanense* (*q.v., infra*), 164
  - *T. brucei*, 164
    - Division Processes in, 164
  - *T. congolense*: Schizogony of, 164
  - *T. cruzi* (*Schizotrypanum cruzi*), Schizogony of, 166–7
    - Triatoma Infected by, 166
  - *T. equiperdum*: Schizogony of, 164
  - *T. evansi*, 164
  - *T. gambiense* Infection in *Cynonycteris straminea*, 235
  - *T. lewisi*: Division Processes in, 164
  - *T. marocanum*; Equine Disease due to, 163
  - *T.* of Mazagan: Virus of, 163
  - *T. rhodesiense*, 163
  - *T. rotatorium*; Culture-Studies on, 164
  - *T. soudanense*, 164
  - *T. vivax*: Biometric curves of, 162
- TRYPANOSOMIASIS
  - ANIMAL
    - DEBAB
      - Infection Experiments, 163
    - EQUINE
      - Moroccan forms; Identification of, Virus Causing, from Two Sources, 163–4

Sleeping Sickness—*cont.*
- TRYPANOSOMIASIS—*cont.*
  - ANIMAL—*cont.*
    - NAGANA: Strains of: Sensitiveness to Arsenic, and to Antimony, 162–3
    - SURRA: Immunity to, Acquired, by Goats, 163–4
  - HUMAN
    - AFRICAN
      - Incidence
        - Geographical
          - Belgian Congo, 161
          - Hausaland, 35
        - Sex, 161
      - Malarial Infection resembling, 10
      - Prophylaxis
        - Protective Headpiece against Glossina, &c., 234–5
      - Treatment: Ambulatory and Hospital: Results, 162
        - by Arsenic, 162
    - AMERICAN, *T. cruzi* Infection, or Chagas's Disease
      - Acute form, 165
      - Chronic Form, 165
      - Criticism in relation to, 165, 166
      - Goitre in relation to, 166
      - Histo-pathology of, 165–6
      - Incidence
        - Age, 165
        - Geographical
          - Argentina, 166
      - Symptoms, 165–6
        - in Acute form, 165
- Tsetse-flies, *see* GLOSSINA, *supra*

Small Pox
- Incidence
  - Geographical
    - Germany (Epidemic, 1917), 266
    - Java, 231
- Prophylaxis
  - Vaccination and Re-vaccination: Results: East Java, 231
- References to Literature, lxvii

Sodoku, *see* **Rat-Bite Fever**

Sprue, 276–9
- Blastomycetes Associated with, 276–7
- Causal Organism; Distinguishing Features, 233
- Diagnosis, 279
- Etiology, 276–7, 279
- Experimental, 276–7

Sprue—*cont.*
- Incidence
  - Age, 276
  - Familial, 276
  - Geographical
    - American Continent, and U.S.A., 233, 279
    - Mecca, 278
    - Serbia, 215
  - Locale, 276
  - Race, 276
  - Sex, 215, 276
- Misdiagnosed as Pellagra, 276
- Monilia associated with, 276, 277, 278
  - *M. enterica*, 278
  - *M. psilosis*
    - Postulated as Specific Agent, 276
    - Toxicity and Serological Reactions, 277–8
- Oidia associated with, 276, 277
- Pathology, 279
- References to Literature, xxvii, lxvii
- Symptoms, 276, 278, 279
- Treatment, 279
  - Dental, 278
  - Dietetic, 278
  - Medical, 278
  - Monilia Vaccine, 278

Strongyloidosis, *see under* **HELMINTHIASIS**

Syphilis
- Diagnostic Serum Reactions Indicating, 409
- Incidence
  - Geographical
    - Porto Rico, 387
    - Sumatra, 218–19
  - Race, 218–19
  - Sex, 219
- Indications of, 281
- in Malarial Patients: Wassermann Reactions in relation to, 304
- in relation to
  - Leishmaniasis, 145
  - Pseudo-Leishmaniasis, 156
  - Still-births, 219
- References to Literature, xxxvi, lxxv
- Tissue Changes in, resembling those of Tuberculosis, 406
- Treatment by Luargol, 30
- Type Prevalent in Porto Rico, 387

Taeniasis, *see under* **HELMINTHIASIS**

Three-Day Fever, *see* **Pappataci Fever**

Trematode Infections, *see under* **HELMINTHIASIS**
- References to Literature, ix

Trench Fever, *see under* **FEVERS UNCLASSED**

Tricocephaliasis, or **Trichuriasis,** *see* TRICOCEPHALIASIS, *under* **HELMINTHIASIS**

Tropical Sore, *see* DERMAL LEISHMANIASIS, *under* **KALA AZAR**

Trypanosomiases, *see under* **SLEEPING SICKNESS**

Tsutsugamushi Disease, *see* **Japanese River Fever**

TUBERCULOSIS IN NATIVE RACES, 411–16
- Alleged Fatality to Tropical Natives, 414
- Alleged greater Mildness in Europeans Controverted, 414
- Bacteriology
  - Bacillus
    - *B. tuberculosis*
      - Madagascar Strains, Mildness of: Cures Frequent, 415
      - in Sputa: Accra, 210

- of BONES: Heliotherapy for, 232

- BOVINE: Rare in India, 413

- Diagnosis by Cuti-Reaction Test, 414

- GENERALIZED, in Filipino Infants, 215
- Gland Index in School Children, 413–14
- Incidence
  - Age, 216, 414
  - Class
    - Jail Prisoners (Indian), 413
    - Soldiers, 232, 413
  - Geographical
    - Andamans, 413
    - Brazil
      - Rio de Janeiro, 415
    - Burma, 413
    - Constantine Steppe, 414
    - Dutch East Indies, 414
    - Ecuador, 218
    - France, Southern, 226
    - French Guiana, 415–16
    - India, 411–13
    - Madagascar, 415
    - Philippine Islands, 216
    - U.S.A.
      - Southern States, 416
  - Race, 226, 232, 414, 416
- Indian Statistics on, 412–13

Tuberculosis in Native Races —*cont.*
- Mortality from
  - Bombay, Calcutta, Madras, 412
  - French Guiana, 416
  - Rio de Janeiro, 415
- Prophylaxis, 415
  - Hospital Facilities for U.S.A. Negroes, 416
  - Suggested, for India, 411–13
  - Tuberculosis Dispensaries, 412
- References to Literature, xxxvii, lxvii
- Spread of, in India, 411, 412

- TESTICULAR: Heliotherapy for, at Tunis, 232

- Tissue Changes in, Simulated by Syphilis, Leprosy, and Sporotrichosis, 406
- Treatment by
  - Creosoted Oil, 415
  - Heliotherapy, 232
  - Tuberculin of Denys, 415
- Transmission by
  - Migration, 411, 413
  - Overcrowding, &c., 411, 412
  - Spitting, 112, 413, 415
- von Pirquet's Reaction Invalid in Tropical Races, 414

Typhoid Fever, *see under* **ENTERIC FEVERS IN THE TROPICS**

TYPHUS, 123–42
- Abscesses as Complications, 131
- Ambulant Cases, 124
- Bacteriology
  - Agglutination in, 133–4, *diag.*, 133, *table*, 134
  - Agglutination Curves for all Organisms Associated with, 135
  - Virus-passage through 100 Guinea-pigs: full retention of Virulence, 141
  - Bacillus(i)
    - *B. typhi-exanthematici*
      - Agglutinins, &c., for, Present in Convalescents, 133–4
      - Cultivation from Infected Pediculi (*P. corporis*), 136
      - Organism of Mexican form Identical with, 127
    - Plotz-Baehr Olitsky Bacillus in relation to, 123
    - of Proteus group
      - Isolated by Zeiss, 140
      - Used in Weil-Felix Reaction, 138–40
  - Coccus in Blood and Urine in, 142
- Bed-bugs as Vectors, *see Cimex, infra*

Typhus—*cont.*
- Black Fever or Mbetalala of the Transkei: Epidemics, and Increasing Virulence of, 127–8
- Blood Conditions and Changes during, 130
- Brill's Disease, Infection with, as Protection against more Virulent forms, 127
- *Cimex lectularius* as Vector, 124
- Coincident with Relapsing Fever: Balkan Regions, 213
- Complications, 133, 134
  - Causes, Characters, &c., 123, 124, 131
  - Mortality due to, 134
- Conditions favouring Outbreaks and Endemicity, 128
- Contacts
  - Antibody Development in, 134–5
  - Negative Weil-Felix Reactions given by, 140
- Course, 213
- Death rates of Radom Epidemic, 124
- Diagnosis
  - Blood Picture, 130
  - Differential, 128, from
    - Relapsing Fever, 199
    - Rocky Mountain Spotted Fever, 188
  - Various Methods
    - Agglutination Test; When of Service, 133
    - Colour Reaction of Urine, 129
    - Serology; Researches: Results, 139–40
    - Weil-Felix Reaction, 125, 138–40, 200
- Double-Infection, 123
- Erysipelas, &c., as Complications, 131, 134
- Etiology
  - Organism of Proteus Group Isolated by Zeiss, 140
  - Researches into, 123–4
- Experimental
  - Scrotal Lesion in Guinea-pigs, 141
- Experimental Inoculation Results, 126
- Fleas as Vectors, *see* Pulicidae, *infra*
- Gait as Distinguishing from Early Relapsing Fever, 199
- Histological Changes, 141
- Immigrant Disinfection: Port of New York, 125–6
- Immunization, *see also* Vaccination, *under* Prophylaxis
  - Experiments, with *B. typhi-exanthematici* Cultures, 135–6
- Incidence
  - Class, 124, 125, 126, 129, 131, 134

Typhus—*cont.*
- Incidence—*cont.*
  - Geographical
    - America U.S., 135, 136
      - California, 126
    - Austria, 129, 135
    - Balkan-Adriatic Regions, 136, 141, 213
    - Bulgaria, 135
    - Germany, 123
    - Mexico, 126, 127, 135, 141
    - Morocco, 141
    - Poland, 136
      - Radom Epidemic, 124–5
    - Roumania, 132
    - Russia, 135, 141
    - Serbia, 124, 135
    - Tunis (Sidi-Abdullah Epidemic, 1916), 131
    - U.S. Africa
      - Cape Province, 127–8
    - Volhynia, 133
  - Race, 123, 124, 129, 131, 134
  - Season, 124, 127
- Incipient, Resemblance to Pappataci Fever, 213
- Incubation Period, 129
- Insect Vectors, *see* Cimex, *supra, and* Pediculi, *and* Pulicidae, *infra*
- Kerosene as Vermicide, 125
- Lice in relation to, *see* Pediculi, *infra*
- Mexican form or Tabardillo: Etiology: Causal Agent Identified, 127
- Pediculi in relation to
    - Infection Experiments on, with Rickettsia, 137
    - Sulphur Dioxide Ineffective with, 126
    - as Transmitters, 123–4, 195, 213
    - When Infectible, 123, 124
    - When Infectious, 123
    - Varieties harboured by Mexican Immigrants, 126
  - *P. corporis*, *B. typhi-exanthematici* Cultivated from Infected, 136
- Pneumonia as Complication, 134
- Prophylaxis, 128, 213
  - Californian Methods, 126
  - Disinfection of Contacts: Port of New York Methods, 125–6
  - Infection with Brill's Disease, 127
  - Inoculation or Vaccination, 141–2
    - With Human-derived Coccus, 142
  - Lice-Destruction; Efficacy of, 199
  - Measures for Stamping out Epidemics, 132
  - Military, in the Field, 128
  - Quarantine, 125
    - Post Epidemic, 124

Typhus—*cont.*
- Prophylaxis—*cont.*
  - Tar- and Butter-soaked Body Linen, 235
- Pulicidae as Vectors, 124
- Rash, 127, 128, 141, 213
- References to Literature, xxvii-ix, lxviii-lxx
- Resemblance of, to Rocky Mountain Spotted Fever, 141
- Rickettsia in relation to Experiments on, 137
  - *R. prowazeki*
    - and Organisms Resembling, in, 137–8
    - as Phase in Evolution of Virus, 123–4
- Sequelae, 213
- Sera-Variation as to Height of Agglutination titre, 139
- Summary of Recent
  - Information on, 128
  - Work on, 127
- Symptoms, Cerebral, with Meningeal Permeability, 129–30
- Tabardillo, *see* Mexican, *supra*
- Transmission by
  - Dirt, 128
  - Overcrowding, 128
  - Pediculi, 123–4, 128, 195, 213
  - Pulicidae, 124
- Treatment by
  - Adrenalin, 128
  - Camphorated Oil, 128
  - Serotherapy, 131–2
    - by Intra-arachnoid Injections, 132
  - Silver Colloids, 128
    - Some Injurious Effects, 125
  - Spartein, 128
- Vaccines for
  - Nature of, 142
- Vermicides, Effective and Other, 125, 126
- Virus
  - Pediculi in relation to Evolution of, 123–4, 125
  - Vigour Maintained after 100 passages, 141
  - When Transmissible to Pediculi, and When Re-Transmissible by them, 123, 125

Typhus—*cont.*
- Virulence not Lessening Towards end of Epidemics, 125
- Weil-Felix Reaction in: Clinical Significance, 138, 139, 140
  - With Urine, 138–9
- Widal Reaction in, in Typhoid expatients or Inoculees, 134

Ulcers, *see under* **SKIN DISEASES, TROPICAL**

Uncinariasis, *see* ANKYLOSTOMIASIS, *under* **HELMINTHIASIS**

Undulant Fever (Malta Fever)
- Incidence
  - Geographical
    - Macedonia, 214
- Malaria resembling: Balkan Regions, 9

Weil's Disease, *see* SPIROCHAETOSIS ICTEROHAEMORRHAGICA, *under* **RELAPSING FEVER**

YAWS
- Incidence
  - Geographical
    - Porto Rico, 387
- Keratoderma differentiated from, 398
- as Pseudomycetomata, 390

YELLOW FEVER
- Arneth Counts in, 8, 230
- Incidence
  - Geographical
    - Ecuador (almost extinct), 218
- Malaria resembling: Balkan Regions, 9
- Possibly a Spirochaetosis, 210
- References to Literature, xxix, lxx
- Resemblance to, of Weil's Disease, 210

APPLIED HYGIENE IN THE TROPICS.

(Sanitation No. of *Tropical Diseases Bulletin*, Vol. 11, No 5)

CONTENTS.

SECTIONS.

	PAGES.
Book Review	384–5
Disease Prevention	319–43
Reports	317–18
Sanitary Organisation	344–54
Sanitary Rulings	355
Sanitary Works	361–79
Treatment of Waste	356–60
Vital Statistics	380–3

CORRESPONDENCE 386

DIAGRAMS.

Breakpressure Column, Section of 366
Infiltration Tunnel at Mazzara, Sicily 375
Khazana
  (a)—Section through 364
  (b)—Plan 364
Vegetable Bazaars: Madras. Plan, Details, and Sections .. *facing* 353
Water Conveyed across River by Siphon Principle (Malik Umber Works) 366

TABLES.

Return of Officials who Left the [East African] Service during 1916 .. 381
Statement of Results of Pumping of Certain Water Works in the Madras Presidency 368–9

APPLIED HYGIENE IN THE TROPICS.

INDEX OF AUTHORS.

Allan, —, 327, 329

Balfour, A. H., 330
Bannerman, —, 370
Bentley, C. A., 376
Bolduan, C. F., & C. Krumwiede, 337
Buchanan, W. J., 339, 353
Bunker, G. C., 371
Burrows, D., 328
Burton, —, 382

Clemesha, —, 358
Cole, A., & E. Muir, 359
Curry, T. A., 322

Darnall, C. R., 341

Eijken, P. A. A. F., & G. Grijns, 356

Fanning, —, 374 *n*
Fearnside, —, 333
Fretz, W. H., 382

Gifford, L., 338
Greening, W. R., 324
Grijns, G., *see* Eijken & Grijns
Grubbs, S. B., 336

Haddon, —, 333
Harrison, W. H., 321
Hodgson, —, 326
Hormasji, —, 333, 336
Howard, A. H., 321
Hutchinson, F. H. G., 327, 332
Hutton, W., 370

Justice, —, 344, 350 *n*., 370

King, W. G., 317, 384
Krumwiede, C., *see* Bolduan & Krumwiede

Low, G. C., 330
Luiggi, L., 374
Lynch, G. W. A., 382

McCay, —, 339
McLean, W. H., 351
Maloney, —, 364
Marrett, W., 374
Maury, D. H., 361
Mauté, —, 330
Mhaskar, K. S., 334
Mills, R. G., 318 *n*
Moseley, C. A., 330
Muir, E., *see* Cole & Muir

Nesfield, —, 341

Ozzard, A. T., 319

Parker, H. B., 336
Partridge, —, 362
Poore, G. V., 359
Price, A. B., 377

Rao, K. R., 325, 331

Saville, C., & H. W. van Hovenbery, 323
Schmidt, H. F., 372
Scott, H. H., 327, 330, 335, 337
Stanley, A., 333

Tappan, J. W., 350
Thompson, J. E., 338

van Hovenbery, H. W., *see* Saville & van Hovenbery

Watson, M., 319
Westfield, —, 341
White, N., 334
Williams, —, 333
Woods, F. W., 322

Young, W. A., 328, 330

APPLIED HYGIENE IN THE TROPICS.

INDEX OF SUBJECTS.

Bacteriology
- *B. coli*, Persistence of, in Sewage-Polluted Water, 356-7
- Bacteria-Elimination from Waterworks Filters, 372–3

Chemotherapy
- Drugs Tested for Yaws: Jamaica, 330–1

Correspondence
- Letter from Messrs. Bale, Sons & Danielsson, on Daniel's & Newham's *Laboratory Studies in Tropical Medicine*, 386

Countries Referred to
- Afghanistan: Waterworks, 374
- America, U.S.
    - Anti-Malaria Measures: Dallas, 323–4
    - Anti-Plague Fumigation of Ships, 336–7
    - Camp Sanitation, 351
    - Diseases Prevalent, 323–4, 332–3, 337
    - Interstate
        - Quarantine, 351
        - Sanitation, 350–1
    - Water Purity: Massachusetts, 342–3
    - Water-Supply of Cantonments, 361–2
    - California: Woodstave Water Pipes, 363
    - New York City: Typhoid Epidemic, 337
- Anguilla
    - Vital Statistics, 382
    - Water Scarcity, 382
- Australia
    - Queensland
        - Anti-Venereal Measures, 355
        - Leprosy in: Treatment, 338
- Burma
    - Diseases Prevalent, 333, 336
    - Markets in, 352
- Cameroons: Dysentery in Troops at, 329

Countries Referred to—*cont.*
- China
    - Shanghai: Beriberi at, in Jail, 333
- Dutch Indies
    - Persistence of Microbes in Soil; Tests of, 356 *sqq.*
- East Africa
    - Death Rates, 380
    - Invaliding Rates, 381
- Eastern War-Front
    - Amoebiasis prevalent, 330
- Ecuador
    - Diseases Prevalent, 336
- Egypt
    - Municipalities, 352
    - Town Development in, 351–2
- England and Wales
    - Public Health Act, Provision of, for Financing Private Improvement Expenses, 351
- Fiji: Vital Statistics, 382–3
- Guiana, British
    - Malaria in relation to Agriculture in, 319–21
- India
    - Reclamation of Water-Logged Tracts, 322–3
    - Reinforced Concrete Roofs, 377–8
    - Urine-Filtration by Sawdust, 359–60
    - Waterworks, 374
        - Wood-Stave Pipes for, 362-3
    - Bengal
        - Anti-Malaria Measures, 319
            - Experimental, 376–7
        - Death, and Sickness Rates for Malaria, 319
        - Diseases Prevalent, 319 *sqq.*, 339
        - Jail Death Rate Diminution, 353
        - Jail Diet; Grains in, 339
        - Jail Diseases, 339
        - Quinine Prophylaxis, 327
    - Bombay
        - Diseases Prevalent, 327-8, 332
        - Loans for Sanitary Building Purposes, 351
        - Quinine Prophylaxis, 326–7

Countries Referred to—*cont*
- India—*cont*
  - Bombay—*cont.*
    - Poona
      - Diseases Prevalent, 327–8
      - Type Conservancy System, 359
  - Deccan
    - Malik Umber Water Works, 363 *sqq.*
  - Madras City
    - Anti-Malaria Measures, 325–6
    - Arboriculture, 354
    - Death Rate, as Influenced by Water Supply, 340
    - Diseases Prevalent, 331–2
  - Madras Presidency
    - Children's Act (1917), 355
    - Diseases Prevalent, 325–6, 333–5
    - Economy in Structure of Market Building Roofs, 378
    - Grains used for Food, 339–40
    - Irrigation Control, 321–2
    - Markets, 352–3
    - Sanitary Inspectors and Staffs, 344–9
    - Water-Control in Irrigation, 321
    - Overcrowding, and need of Tramway Extension, 378
    - Water-Storage and Purification Methods, 370
  - Punjab
    - Arboriculture, 353–4
    - Canal Wastage, 322
    - Town Destruction by Rain: Re-planning after, 379
- Italy; Waterworks, 374
- Jamaica; Diseases Prevalent, 327, 330, 335–6, 338–9
- Korea
  - Control of
    - Leprosy, 318
    - Meat-Supplies, 317
    - Public Resorts, 317
    - Veterinary Matters, 318
    - Water-Supplies, 317
  - Diseases Notifiable, 317
  - Diseases Prevalent, 317, 318
  - Sanitary Progress, 317–18
  - Vital Statistics, 317
- Mexico; Delousing, at El Paso, 350
- Nyasaland
  - Death Rates, 380
  - Invaliding Rates, 381
- Panama Canal Zone
  - Water-Purification Plant, Laboratory Control of, 371–3
- St. Kitts-Nevis; Vital Statistics, 382
- Sierra Leone
  - Diseases Prevalent, 328, 330
  - Mosquitoes of, and their Breeding Places, 327
- Somaliland
  - Death Rates, 380
  - Invaliding Rates, 381
- Spain: Waterworks, 374

Countries Referred to—*cont.*
- South Africa
  - Anti-Malaria Campaign (1915): Results, 324–5
  - Diseases Prevalent, 324–5
- Turkey: Waterworks, 374
- Uganda
  - Death Rates, 380
  - Invaliding Rates, 381
- Venezuela
  - Diseases Prevalent, 327, 383
  - Vital Statistics, 383
- Zanzibar
  - Death Rates, 380
  - Invaliding Rates, 381

Disease Prevention, 319–43
- DISEASES AND CONDITIONS REFERRED TO
  - Amoebiasis, 317, 328–30, 336
  - Ankylostomiasis, 333–5
  - Ascariasis, 334, 335
  - Beriberi, 333
  - Blindness, 355
  - Bowel Complaints, 338, 339
  - Chicken-pox, 336
  - Cholera, 317, 328 *n.*, 353
  - Diarrhoea, 327–8
  - Diphtheria, 317
  - Dysentery, 327, 330
    - Bacillary, 317, 336
  - Helminthic Infestations, 330, 334, 335, 336
  - Leprosy, 318, 338
  - Lunacy, 355
  - Malaria, 319 *sqq.*, 329, 336, 338, 374
  - Mental and Nervous, 355, 388 *& n.*
  - Paratyphoid, 317
  - Plague, 336–7
  - Pneumonia, 338
  - Poliomyelitis, 336
  - Rocky Mountain Spotted Fever, 332–3
  - Scarlet Fever, 317
  - Smallpox, 317, 331–2, 336
  - Syphilis, 355
  - Tetanus, 383
  - Tuberculosis, 336
  - Typhoid, 317, 336, 337, 338
  - Typhus, 317, 350
  - Venereal, 351, 355
  - Vomiting Sickness, 327, 335–6
  - Yaws, 330–1
  - Yellow Fever, 329, 336
    - Presumed, 327
- METHODS EMPLOYED
  - Anti-Dysentery Measures, 328–30
  - Anti-Malaria Campaigns and Measures, 319 *sqq.*, 327, 376–7
    - Economics of, 324
    - Water-Works as, 373 *sqq.*
  - Anti-Plague Measures, 336–7

Disease Prevention—*cont.*
- METHODS EMPLOYED—*cont.*
  - Anti-Small-pox Measures, 331–2
  - Anti-Venereal Measures, 355
  - Control of Chronic Carriers, 337
  - Delousing, 350
  - Disinfection of [Helminthic] Faeces, 335
  - Food
    - Fixed Diets in Jails, Bengal, 339
    - Food-grains in relation to Disease, 339
      - Physical powers, 340
    - Food Preparation, Precautions as to those Employed therein, 337–8
  - Hospital-Provision, 318
  - Larvicides
    - Fish, 323, 326
    - Oil, 323, 324, 325
  - Lectures, Public, 350 *& n*
  - Leper Hospital provision, 318
  - Prophylactic Institutions, U.S.A., 350–1
  - Quinine Prophylaxis, 326–7
  - Sheep-grazing, for Eradication of *Dermacentor orientalis*, U.S.A., 332–3
  - Ship Fumigation, 336–7
  - Subsurface Water Tunnels, 374
  - Vaccination, Prophylactic for Small-pox, 331, 350
    - Re-vaccination urged, 332
  - Widal's Reaction, for Safe-guarding the Preparation of Food, 337–8

General References
- Ackee-Poisoning, as Cause of Vomiting Sickness, 336
- Agriculture as Anti-Malaria Measure, 319 *sqq.*
- Anopheles
  - Breeding-places, 320, 323, 324–5, 327
  - Carriers of, 325
  - Flight-Range Questions, 321, 376
- Caste, Indian, and Sanitary Staffing, 344–5
- Cattle as Carriers of Anopheles, 325
- Cesspools near Wells, in relation to Intestinal Disease, 329, 357, 358
- Chlorine for Water-Sterilization, 341
- Culicidae of Sierra Leone: Well-Breeding, 327
- Drainage as Anti-Malaria Measure, 319 *sqq*,
- Drainage Areas in relation to Anopheline Flight Distances, 321
- Flies as Carriers of
  - Diarrhoea and Dysentery, 328
  - Yaws, 331

General References—*cont.*
- Insect Vectors, postulated, of Beri-beri and Similar Diseases, 332
- Irrigation-Control, 321–2
- Mosquitoes, *see* Anopheles, Culicidae, Stegomyia, &c.
- Practical Demonstration of Benefits of Sanitation, Value of, 323
- Quinine-Tablet Making: Bengal Jails, 327
- Rat-Destruction: Rangoon, 336
- Rat-Flea Theory of Plague Spread, 336
- References to Literature, xl, lxxix
- Stegomyia of Sierra Leone: Tree-Breeding, 327
- Tick-Eradication by Sheep-Grazing, 332–3
- Veterinary Control: Korea, 318
- Wyman Sanitary Railway Car, U.S.A., for Supervising Interstate Water-Supplies, 349

Reports, 317–18; for Details, *see under* **Countries**

Review of Book
- Standard Methods for the Examination of Water and Sewage (Anon.), 384–5

Sanitary Organisation, 344–54
- Arboriculture: India, 353–4
- Delousing Travellers from Mexico, 350
- Interstate, U.S.A., 350–1
- Jails, Indian, Death-Rate decline in, 353
- Markets
  - Burma, 352
  - Egypt, 352
  - Madras, 352–3
- Municipalities: Egypt, 352
- Sanitary Dwellings, Loans for Building, 351
- Sanitary Staffs for India, 344–9
  - Education and Discipline: Madras, 345–9
- Town Development in Egypt, 351–2

Sanitary Regulations
- Korean, 317–18

Sanitary Rulings, 355
- Eugenics, 355
- Madras Children's Act. (1917), 355
- Tank Clearing (Suggested for Madras), 326

Sanitary Works, 361–79
- Anti-Malarial Measures, Experimental; Bengal, 376

Sanitary Works—*cont.*
- Market Buildings; Roofs, and Economy in Structure; Madras, 378
- Meteorology and Town Planning; Punjab, 379
- Overcrowding and Tramways; Madras, 378
- Roofs of Reinforced Concrete India; 377–8
- Water-Storage: Sun-action on Tanked Water, 370
- Water-Purification
  - Laboratory Control of: Panama, 371–3
    - Aeration, influence of, on Carbon Dioxide, 371–2
    - Carbonic Acid Free Waste from: How Dealt with, 371–3
    - Filters, 371
    - Treatment by
      - Alum, 371
      - Alum and Lime, 372
      - Chlorine, 373
- Water-Purification Plant, 370, 371–3
- Water-Supplies
  - as Anti-Malaria Measure, 373 *sqq.*
  - Cost of, for Pumping and Disposal, 364–7, *table*, 368–9
- Waterworks
  - Makeshift with
    - Pipes of
      - Earthenware, 363–4
      - Wood Staves, 362–3
  - 16th Century Indian (Malik Umber), details of, 363 *sqq.*
- Water-Waste Prevention, 370

Treatment of Waste, 356–60
- Sawdust for Urine Filtration, 359–60
- Self-Depuration of Water and Soil, 357–9
- Septic Tank Latrines, 358–9
- Soil, and Night Soil, Persistence in, of Microbes: Experiments on, 356 *sqq.*
- Type Conservancy System, 359

Vital Statistics, 380–3 *see also under* **Countries**
- Anguilla, St. Kitts, and Nevis, 382
- Death-Rates, as influenced by Water-Supplies, 340
- East Africa, 380–2. *table*, 381
- Fiji, 382–3
- Venezuela, 383

Water
- Sterilization, for Travellers' Use, 340–2
  - Chlorogen for Soldiers' Use, 341–2
  - Electrolytic Methods, 341

Water Supplies
- in relation to
  - Amoebiasis, 328–30
  - Diarrhoea and Dysentery, 328
  - Malaria, 373 *sqq.*
- of Cantonments, U.S.A., 361–2
- Interstate: Protection of, 342–3, 349
- Madras City: Fall in Death-Rate due to, 340
- Purity of: Massachusetts, 342–3
- Water Troughs, Open, Danger from, 328 *n*
- Well-Pollution, 329, 357, 358

LIST OF REFERENCES.

For the benefit of recipients of the Bulletin, who wish to make a **Card Catalogue,** or to preserve a consecutive record of the references on any subject, **galley proofs** [*'Korrekturbogen'*; *'Première'*] of the **Quarterly Lists of References** (printed on one side of the page) can be supplied at the subscription price of **Two Shillings** per annum. They are obtainable from the beginning of 1914 onwards. Application should be made direct to the Bureau.

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